

















A NATURAL HISTORY OF THE DUCKS

IN FOUR VOLUMES

VOLUME IV













For Benson by John C. Phillips



# A NATURAL HISTORY OF THE DUCKS

BY  
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OF COMPARATIVE ZOÖLOGY AT HARVARD COLLEGE

WITH PLATES IN COLOR AND IN BLACK AND WHITE

FROM DRAWINGS BY

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AND  
S. KOBAYASHI

VOLUME IV

*FULIGULINÆ (CONCLUDED), OXYURINÆ, MERGANETTINÆ  
AND MERGINÆ*



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A NATURAL HISTORY OF THE DUCKS  
SUBFAMILY FULIGULINÆ (*concluded*)







## BLACK SCOTER

*OIDEMIA NIGRA* (LINNÉ)

(Plates 72, 73, 75, 77)

### SYNONYMY

*Anas nigra* Linné, Systema Naturæ, ed. 10, vol. 1, p. 123, 1758.

*Anas cinerascens* Bechstein, Ornith. Taschenbuch, vol. 2, p. 437, 1803.

*Anas atra* Pallas, Zoographia Rosso-Asiatica, vol. 2, p. 247, 1811.

*Oidemia nigra* Fleming, Philosophy of Zoology, vol. 2, p. 260, 1822.

*Melanitta nigra* Boie, Oken's Isis, p. 564, 1822.

*Platypus niger* Brehm, Lehrbuch Naturg. Europ. Vogel, p. 820, 1824.

*Fuligula nigra* Bonaparte (in part), Ann. Lyceum Nat. Hist. New York, vol. 2, p. 390, 1826.

*Melanitta nigripes* Brehm, Oken's Isis, p. 998, 1830.

*Melanitta megauros* Brehm, Oken's Isis, p. 998, 1830.

*Melanitta gibbera* Brehm, Oken's Isis, p. 998, 1830.

*Oedemia nigra* Bonaparte, Cat. Met. Uccelli Europ., p. 73, 1842.

*Oedemia gibbera* Brehm, Vogelfang, p. 383, 1855.

*Oedemia nigripes* Brehm, Vogelfang, p. 383, 1855.

*Oedemia megauros* Brehm, Vogelfang, p. 383, 1855.

*Somateria nigra* Selys-Longchamps, Patria Belg., vol. 1, p. 277, 1873.

Additional synonymy under Geographical Races.

### VERNACULAR NAMES

*English:* Black Scoter, Common Scoter, Scooter, Black Diver, Butter-bill, Yellow-bill, Butter-nose, Copper-nose, Copper-bill, Black Coot, Smutty Coot, Fizzy, Broad-billed Coot, Whistling Coot, Whistling Duck, Sleigh-bell Duck, Hollow-billed Coot, Gray Coot, Brown Coot, Black Duck, Yellow-nosed Coot, Booby Duck, Sleepy Diver, Little Black Diver.

*Italian:* Orchetto marino, Macrosa, Orco marino minore, Corvo marin, Annia neigra.

*Welsh:* Cwm ebril.

*German:* Trauer-ente, Trauer-tauchente, Schwarze Ente, Schwarze Seeente, Mohrente, Kleine Ruderente, Weissbackenente, Weisskehlchen, Zwergente, Nacht-vagel, Frauenente.

*French:* Macreuse ordinaire, Macreuse commune, Macreuse noire, Canard macreuse, Fuligule noire, Morillon noir, Pilet à crête, Bisette, Mourette, Grisette, Macreuse pilet, Pilet brun, Jeffre noir, Gal-du.



*Spanish:* Pato negro, Morell de mar, Anade negreta, Ocasle.

*Portuguese:* Negrola, Pato do mar.

*Icelandic:* Hrafnstönd, Dukönd, Duggönd.

*Gaelic:* Tannag-dubh.

*Norwegian:* Svartand, Fjell-and, Kulnebsvorta, Sjö-orre, Sort Dupand, Klub-naebsvorta, Sort-and, Havorr.

*Dutch:* Zwarte Zee-eend, Wigstaart, Noordsche Eend, Zwarte Bergeend.

*Danish:* Sortand, Kuland, Svaerten, Sort Himmelkund.

*Swedish:* Sjöorre, Hafsorre, Svärta, Wattenorre, Doppand, Pjuk, Svartand.

*Basque:* Atabeltza.

*Moorish:* Bourk-el-behar.

*Samoyede:* Narmyti.

*Yakutsk:* Queuheul-hach.

*Eskimo:* Too-tár-lik, Kukumzhaguk (Alaska); Uvingiajok (Labrador).

*Cree Indians:* Cuscusitatum.

*Lapp:* Njurggo, Njurkku.

*Finnish:* Merilintu, Mustalintu, Njuorkua, Meriteiri, Musta-telkkä, Hanhisuorsa, Kuorpiuorsa.

*Russian:* Chernayantka, Sinjga, Morskaya, Chernet, Sangi, Turpan, Maley-turpan chernimshka.

*Polish:* Kaczka czarna.

*Esthonian:* Melnd pihle.

*Helgoland:* Knobbed, Bührn.

*Czech:* Kachna černá.

*Croatian:* Patka črna, Crni turpan.

*Hungarian:* Fekete récze.

*Friesian:* Swarte Dukelein, Swarte Seduker, Kolk-ante.

*Bashkir:* Suktabash.

*Ostiak:* Sing.

*Japanese:* Kurogamo.

## DESCRIPTION

**ADULT MALE:** Entire plumage black with a purplish gloss upon the head and neck, and a less brilliant gloss of purplish or greenish tones on the upper side of the body. Under side a duller black, or even brown-black, especially along the center of the abdomen. Wing without a speculum and with the inner web of the first primary (in reality second primary on account of small concealed first primary) deeply cut away or emarginate for the terminal 70 mm. Shape and size of bill different in European and American races (see under Geographical Races at end of account).

Iris dark brown. Bill black; in the American race nearly the whole basal part of culmen to a little forward of nostrils brilliant yellow. In the European race the yellow area is confined to the middle part of the culmen around the nostrils and forward nearly to the nail. Legs and feet dirty blackish or with an olivaceous tinge; webs darker.





BLACK SCOTER

Adult Male

Adult Female

Immature Male







Weight 2 pounds, 5 ounces to 2 pounds, 10 ounces (1.04 to 1.14 kilograms), probably more at times.

Wing 228–242 mm.; bill 45–49; tarsus 44–51.

ADULT FEMALE: Crown of head down to about the eye very dark brown; cheeks, chin, throat and sides of neck light gray, the tips of many feathers having darker markings; whole upper surface of body and tail dark brown, almost black, with lighter tips upon feathers of mantle and scapulars, producing an indistinct barred effect. Lower surface a lighter brown color, especially in the center of the abdomen, where it is mottled and has a whitish appearance.

Iris brown. Bill not at all or only slightly swollen at the base, dull black or greenish black in color. In some specimens (American) there is a yellow patch about the nostrils. Legs and feet as in male (?).

Wing 214–229 mm.; bill 40–45; tarsus 42–46.

Weight about 2 pounds (0.90 kilograms).

MALE AND FEMALE IN FIRST (JUVENAL) PLUMAGE: At this time, that is in late summer and autumn, the sexes are not distinguishable by plumage alone. In general these young of the year resemble the female, but the upper parts are lighter-colored and more uniform, especially on the mantle where the light edging of the feathers is very indistinct or absent. The lower surface is lighter-colored than in the adult female, often ashy white, but showing more or less variation. Tail with square or blunt tips to the feathers. Bill blackish or occasionally with a slight yellow tinge around nostrils.

IMMATURE MALE: The change to adult plumage as well as to the final form and coloring of the bill is very slow indeed. The first male plumage may show no changes before January or February, but a few black feathers may begin to appear as early as late November. These first black feathers come in very irregularly on head, neck, mantle, scapulars or flanks; in fact almost anywhere except on the abdomen. The lower parts remain whitish until after the first summer. Males in their first spring are in all stages of moulting with brown and black areas and with perhaps dark breasts and flanks and new tail-feathers. The base of the bill is yellow by this time, but the knob is not usually well developed until later on. The immature wing-feathers are carried until mid- or late summer, that is until the bird is at least a year old. Young males that have reached almost complete adult plumage as early as April 20 have been described (Dwight, 1914) but such cases must be very unusual.

ADULT MALE IN SUMMER PLUMAGE: There is no very marked difference in general appearance of the adult male in summer, that is no “eclipse” in the commonly accepted use of the term. Scoters of course are moulting throughout the greater part of the year and it is often difficult to say just what moult is actually taking place in a given specimen. A summer male has been described as follows: “Crown, nape, sides of face and sides of neck duller black with less bluish gloss than winter and feathers square at tip and thus with little indication of ‘crimping’ on head and neck; breast, belly and vent browner than winter, feathers sooty-brown or drab-brown shading to black-brown at tip and with ash-brown bases; feathers of sides of body and flanks sooty-brown shading to black at tip; rest of plumage as winter” (Witherby *et al.*, 1919–22). Young males in first summer plumage have not been examined.

ADULT FEMALE IN SUMMER: The upper surface is more barred than in the winter plumage due to abrasion of the edges of the feathers of the mantle and scapulars.

YOUNG IN DOWN (Plate 77): Dark brown to sooty black above and without any white or light-colored dorsal patches. The dark brown of the upper side extends down on to the upper breast; sides and lower abdomen gradually fading into the lighter colors of the lower parts, which are light gray or in



some cases almost white. The face is more or less gray, shading into an even lighter gray on the throat where it may be almost white. Usually a small white spot borders the eye on the lower side. There is no face-pattern and no clear-cut line between the shading of the upper and the lower sides. The young of this species is not easily distinguished from that of the other Scoters. The Velvet or White-winged Scoter has young which are a purer white on the cheeks, sides of neck, chin and throat. The Surf Scoter is almost exactly like the young of the Black Scoter as nearly as I can make out from the few specimens available, but in the former there is no white dot below the eye and a very distinct V-shaped prolongation of the frontal feathering extends from the forehead down upon the culmen. In the Black Scoter this frontal feathering is cut straight across and not prolonged forward. All the young of the Eiders (except Steller's Eider) may be distinguished at a glance from the Scoters by the peculiar prolongation of the bare culmen up on to the forehead on each side. Steller's Eider in down stages is colored almost exactly like the Black Scoter but the bill is much narrower and of a curious hooked shape.

### DISTRIBUTION

THE Common Scoter is a marine duck found in both the Old and the New World, breeding in the Far North and migrating into temperate regions for the winter. It is very difficult to define its breeding range, because a great many non-breeding birds do not go north in the summer, but remain on the wintering grounds, even the most southerly ones. Only the actual discovery of nests can be regarded as satisfactory evidence of breeding, and much confusion has arisen from the repetition of the errors of early writers, Audubon and others.

### BREEDING RANGE

IN Europe the Scoter nests not uncommonly in Iceland, but mostly if not exclusively on the lakes of the northern parts (Slater, 1901; Hantzsch, 1905; Schiöler, *in litt.*; *et al.*). It is not known to have ever nested on the Faroes, but is reported to have done so on the Shetlands in 1911 (Baxter and Rintoul, 1912) and has done so in Tiree, Caithness, Sutherland, Cromarty, Ross, British Isles Tay, Inverness, Perth (Millais, 1913; Baxter and Rintoul, 1922). In Ireland it has been breeding in very small numbers on Lough Erne, since 1905 (H. Noble, 1908; Witherby and Ticehurst, 1908; Harvie-Brown, 1908; Trevelyan, 1909, 1910, 1911; Gordon, 1919; Rathborne, 1919).

On the Continent it nests regularly on the fells of southern Norway and abundantly in northern Norway north to North Cape and eastward to the Finnish border (Wallengren, 1854; Collett, 1873; Norway Dresser, 1871-81; Hartwig, 1889; Schaanning, 1913). In Sweden it nests in Jemtland (Westerlund, *vide* Millais, 1913) but chiefly north of 64°, in Swedish Lappmark (Wallengren, 1854; Nilsson, 1858). It appears to have been found nesting on the island of Oesel, off the Esthonian coast (Stoll, 1911), but does not breed anywhere in southern Finland, Baltic States though it is occasionally seen in summer about Helsingfors (Palmgren, 1913). Dresser (1871-81) states that it breeds, though not commonly, at Kajana, central Finland, and Finland at Uleaborg, while according to Palmén (1876) it nests as far south as Kuopio, where Suomalainen (1908) found it very rare in summer. Farther north, in Lapland, it is a common breeder, especially on the upper Muonio (S. A. Davies, 1905; Montell, 1917) and northward to the Arctic coast (Palmén, 1876). It appears to be more common in western than in eastern Lapland (Finnilä, 1913, 1914, found it not very common about Sodankyla and Kuolajarvi, and says nothing of breeding).

In northern Russia the Scoter nests all over the Kola peninsula (Pleske, 1886; Witherby, 1900; H. J. Pearson, 1904), on the Lakes Wyg and Segosero in northern Olonetz (Sievers, 1877), in Archangel Russia (Alston and Harvie-Brown, 1873; Seebohm, 1882a), and along the lower Petchora (Seebohm and Harvie-Brown, 1876). Evidence of its nesting in Novgorod (Bianchi, 1910), Moscow (Menzbier, 1883) or Perm (Harvie-Brown, 1878) is not conclusive.



North of Europe specimens have been taken on Bear Island on June 21 (Jourdain, 1922) and in 1905 Koenig (1908) took a nest and eggs at Bell Sound, southwestern Spitzbergen. Mathey-Dupraz (1912) also met with this Scoter at Research Bay, Bell Sound, in July, 1906. Farther Arctic east Trevor-Battye (1895) saw a large flock on Kolguev on July 26, and von Heuglin Europe (1872) found the species common on Waigats and southwestern Nova Semlja. According to Buturlin (*fide* Millais, 1913) it nests commonly on Waigats, but rarely in southern Nova Zembla.

In western Siberia Finsch (1877) found the Common Scoter nesting about the lower Ob. Buturlin (*fide* Millais, 1913) states that the breeding area in this region extends south to the lower Tjumen (57° north latitude) in the government of Tobolsk. To the eastward A. T. von Middendorff (1853) found the species nesting, though not commonly, on the Boganida, while on the lower Siberia Jenesei both Seebohm (1879) and Popham (1897) found it abundant and breeding. Maak (1859) found it nesting at Wiljuisk and Bunge (1883; von Bunge and von Toll, 1887) saw them on the Lena north of Yakutsk and rarely at the Lena delta. Buturlin (1908) places the southern limit of the nesting area on the Lena at 58° or 59°. He states that the species breeds commonly on the Jana, Indigirka and Kolyma. None of the Russian explorers seems to have met with it in the Baikal or Amur regions, but on the coast of the Sea of Okhotsk it is said to be not uncommon. J. A. Allen (1905) says a few breed there and that at Yamsk many are reported to nest. On Saghalin specimens and eggs presumably of this species have been taken at Chaivo in June (Hesse, 1915) and some of these birds are said to nest on the more northern islands of the Kurile group (Stejneger, 1898). Nelson (1883) states that it nests on the Asiatic side of Bering Strait, and chiefly to the south of it.

The Common Scoter has not yet been found nesting on Kamchatka or the Commander Islands, though it does so sparingly on the Near Islands and possibly on some of the other Aleutian Islands (L. M. Turner, 1886; Nelson, 1887; Bent, 1912). Nelson (1887) met with it on St. Lawrence Island in summer. On the mainland of Alaska it appears to nest only on the west Aleutian Islands coast. Osgood (1904) found nests at Lake Clark near Cook Inlet and young broods Alaska at the Chulitna River, at the base of the Alaska peninsula. E. Adams (1878) says that a few breed about St. Michael's, though F. S. Hersey (1917) says that they all move on from St. Michael's early in June and L. M. Turner (1886) says the species is more common to the northward than at St. Michael's itself. Dall and Bannister (1869), however, took a nest and eggs at Pastolik at the mouth of the Yukon. Nelson (1883, 1887) says it nests along the coast of Bering Strait and Kotzebue Sound, and eggs have been taken as far north as Cape Lisburne (U.S. Biological Survey).

This is about the extent of our knowledge as to the breeding range in North America. It may be that some nest in others parts of arctic North America. C. A. Reed (1904) claims to have a clutch of ten eggs collected in MacKenzie Bay and R. MacFarlane (1908) says he "has much MacKenzie reason to assume that it bred annually in the Anderson River district, where it had been Hudson Bay occasionally seen by the natives." He records specimens taken at Fort Resolution Ungava and at Lac du Brochet (north of Reindeer Lake). The British Museum has a specimen taken by Rae at Repulse Bay and both W. E. Clarke (1890) and Wright (*fide* J. and J. M. Macoun, 1909) have reported it from Fort Churchill, Blakiston (1863) from the "west coast" of Hudson Bay, and Murray (*fide* Preble, 1902) from Trout Lake, Keewatin. Baird, Brewer and Ridgway (1884) quote Richardson for the statement that the species breeds on Hudson Bay between 50° and 60° north latitude! But thus far there is no direct evidence of any breeding ground in Arctic America east of Alaska. Spreadborough (*fide* J. and J. M. Macoun, 1909) found it common in June on the east shore of Hudson Bay from Cape Jones to Richmond Gulf. Macoun (in J. and J. M. Macoun, 1909) saw migrating birds at Lake Mistassini on May 15, and various observers have reported it common on the east coast of Labrador. No actual nests have been reported. Hantzsch (1908) was told by one of the missionaries at Port Burwell that the species nests occasionally about the southeast part of Ungava Bay, but all these reports apparently refer to non-breeding flocks. The species has not yet been found in Greenland, and Hantzsch (1914) does not appear to have seen it anywhere in southern Baffin Land.



Cooke's (1906) surmise that they breed in northern Ungava is probably wrong and Audubon was in error with regard to the south coast of Labrador.

#### WINTER RANGE

THIS Scoter is not known to have ever wintered in Iceland, but it has occasionally been taken on the Faroes (H. C. Müller, 1869) and in the Shetlands (A. H. Evans and Buckley, 1899). It is abundant on the northern coasts of Ireland but rare in the south (Ussher and Warren, 1900) and in Great Britain it is, as a rule, far more common on the eastern than on the western coasts. Great numbers also winter along the Channel (Dresser, 1871-81; H. Saunders, 1899; Millais, 1913; Witherby *et al.*, 1919-22; *et mult. al.*).

On the Continent this duck is found on the Norwegian coasts as far north as Trondhjem (Schaanning, 1913), occasionally even to Tromsø and Finmark (Collett, *fide* Dresser, 1871-81). It is far more common on the North than on the Baltic Sea, but some are found on the southern coasts of Sweden (Wallengren, 1854; Nilsson, 1858) and the Baltic coast of Germany (Naumann, 1896-1905) and Denmark (*ibid.*). On the North Sea coasts of Denmark (Kjærbølling, 1850) and of Germany (Naumann, 1896-1905; Löns, 1906) it is very abundant, and the same is true of the coasts of Holland (Schlegel, 1859; van Oort, 1922), Belgium (Dubois, 1886; Raspail, 1913) and northern France (Ternier and Masse, 1907; d'Aubusson, 1911; Seguin-Jard, 1912). Farther south it becomes less common, as on the north coast of Spain (Irby, 1883; Lilford, 1895; Aldaz y Amazabel, 1918), though on the coasts of Portugal it is again abundant (Tait, 1896; de Seabra, 1910; *et al.*).

Some have been taken in the Azores (Hartert and Ogilvie-Grant, 1905) and it has straggled to Madeira (Schmitz, 1896) and to the Canaries (Bolle, 1857; Bannerman, 1919). The southernmost record of its occurrence refers to two specimens taken on June 20, 1902 (!) on the coast of Rio de Oro, south of Morocco (Hartert, 1903a). Specimens have also been taken in southwest Morocco at Mogador, March 21, 1912 (Menegaux, 1913); and at Mazagan, a little farther north, Meade-Waldo (1903) found it common early in August. H. and A. Vaucher (1915) have also recorded it as wintering on the coast of Morocco and Favier (*fide* Irby, 1875) speaks of it as common at Tangiers. Loche's (1867) statement that it is common in Algiers in winter, is undoubtedly exaggerated, but J. I. S. Whitaker's (1905) remark that it occurs occasionally in Tunis is apparently supported by a specimen in the British Museum.

All through the Mediterranean the Common Scoter is rare. On the south and east coast of Spain specimens have been taken at the mouth of the Guadalquivir (A. Chapman, 1884), in the Straits (Irby, 1875) and at Malaga, Valencia and Gerona (Arévalo y Baca, 1887). On the south coast of France, in Provence, it is very rare (l'Hermitte, 1916). Arrigoni degli Oddi (1904) says he has a specimen taken in Sardinia and others have been taken in Italy in the Romagna, Tuscany, Liguria, Piedmont, Lombardy and Venice (Giglioli, 1886; Arrigoni degli Oddi, 1904).

In Switzerland, as in all parts of the interior, the Scoter is a rare bird, though it has occurred on the Lakes north of the Alps, particularly on Lake Geneva (Fatio, 1904). There are a few records of its occurrence in winter in the interior of France and Germany, besides about five for Bohemia (Fritsch, 1872), one for Styria (Mojsisovics von Mojsvar, 1889) and four or five for Hungary (*ibid.*; also Chernel, *fide* Naumann, 1896-1905). On the Dalmatian coast the species is very rare (Kolombatović, 1903), but Lord Lilford is said to have seen some off the Albanian coast (Elwes and Buckley, 1870) and Powys (1860) has reported it from Antivari on the Montenegrin coast. Gengler (1920) saw a number in eastern Bulgaria in January. In Greece it appears in small numbers, but chiefly in the northeastern parts (von der Mühle, 1844; Lindermayer, 1860). Its reported occurrence on Cyprus









MAP 96. Distribution of  
Breeding range, dotted  
Sporadic records





Black Scoter (*Oidemia nigra*)

Winter range, broken line  
Indicated by crosses (X)









MAP 96. Distribution of Black Scoter (*Oidemia nigra*)

Breeding range, dotted line; winter range, broken line  
Sporadic records indicated by crosses (X)







(Bucknill, 1910) and on the Palestine coast (Tristram, 1884) has not, to my mind, been convincingly proved.

I have been unable to find any reliable information to support the statement that this Scoter winters on the Black Sea, except Czernay's (1852) note that it winters in Charkow in southern Russia. Pallas (1831) states that some winter on the Caspian. It is true that migrating birds are seen at Astrakhan (Seebohm, 1882; Radde, 1884) and it seems likely that small numbers reach the south Caspian in severe winters (Radde, 1886; Zarudny, 1911).

Where the breeding birds of the Asian arctic coast winter is still problematical. We cannot even say whether any pass the cold months on Lake Baikal, and our knowledge of their status on the eastern Siberian coast is limited. Specimens have been taken as far south as the vicinity of Foochow, China, December 5, 1914 (La Touche, 1917), and it is included by Kuroda (1918) in his list of Korean birds. In Japan specimens have been taken at Yokohama and Hakodadi (Seebohm, 1890). No doubt the species winters all over Yezo and on the Kuriles, for Mr. Kuroda writes me that in northern Hondo it is abundant on the coasts of Hitachi and Kazusa Provinces, and it is found in small numbers on the Commander Islands in winter (Stejneger, 1885; Bianchi, 1909; Hartert, 1920).

On the American side this Scoter (the American subspecies) is common in winter on the Aleutians (Dall, 1874; L. M. Turner, 1886; Nelson, 1887) and on Kadiak (Bretherton, 1896). It is resident on the coasts of British Columbia (Kermode, 1904) and Vancouver (Taverner, 1917), but is not common on the coasts of Washington (Edson, 1908; W. L. Dawson and Bowles, 1909; Rathbun, 1915), Oregon (Woodcock, 1902) or California. There are only about a dozen records of its occurrence in the latter State, though it has been taken as far south as Los Angeles and Santa Catalina (J. Grinnell, Bryant and Storer, 1918). Stray specimens have been taken in the interior in Wyoming (Grave and Walker, 1913), Colorado (W. L. Sclater, 1912), Nebraska (Bruner, Wolcott and Swenk, 1905), Kansas (H. Harris, 1919), Missouri (Widmann, 1907) and Iowa (R. M. Anderson, 1907), once indeed as far south as Lake Catherine, Louisiana (Beyer, Allison and Kopman, 1907).

About the Great Lakes the species occurs a little more frequently. Some have been taken about Lake Superior in Minnesota (Hatch, 1892; Roberts, 1919) and others in Wisconsin (Kumlien and Hollister, 1903), northern Illinois (Woodruff, 1907), Michigan (Barrows, 1912), Ohio (L. Jones, 1903; W. L. Dawson, 1903), western Pennsylvania (Todd, 1904) and western New York (Eaton, 1901).

On the Atlantic coast it is found in winter as far north as Newfoundland (Reeks, *vide* J. and J. M. Macoun, 1909), Prince Edward Island (MacSwain, 1908), New Brunswick (Dresser, 1871-81) and Nova Scotia (Downs, 1888; Tufts, 1918), and thence south commonly along the coasts of New England (G. M. Allen, 1909; *et al.*), Long Island (Braislin, 1907; Eaton, 1910), New Jersey (W. Stone, 1909) and in diminishing numbers in Delaware (Rhoads and Pennock, 1905), Maryland (Kirkwood, 1895), Virginia (Rives, 1890) and North Carolina (T. G. Pearson, C. S. and H. H. Brimley, 1919). It is not at all uncommon all along Pamlico Sound, North Carolina, in winter and I have seen it there in hundreds, if not thousands.

It was seen on May 7, 1903, at Bull's Bay, South Carolina (Wayne, 1910) and has been taken or seen on the Indian River and at Lake Worth, Florida (U.S. Biological Survey). Dr. Thomas Barbour tells me that on April 2, 1921, he saw two of these ducks at Eau Gallie, Florida.

#### MIGRATION AND NON-BREEDING SUMMER AREAS

It is almost impossible to determine the nature of the migration of this Scoter, because on some of the most southerly wintering areas they may be seen late in the season if not all summer. There are as yet no records of banded birds to help us out. Thus in North America as many as two hundred non-breeding birds were seen off Waldron Island, Washington, on June 22, 1905 (W. L. Dawson and



Bowles, 1909) and in the interior several were seen near Edmonton, Alberta, on July 7, 1909 (Stansell, 1909). On the Atlantic coast the records given above show that specimens have been seen so late as April in Florida and May in North Carolina, while along the New England coast some are present all summer. I have seen them mixed in large flocks of White-winged Scoters at various places along the coast of Maine in July and August, and everywhere in the Gulf of St. Lawrence non-breeding summer birds may be seen (Schmitt, 1904; Comeau, 1909; Reeks, *vide* J. and J. M. Macoun, 1909; C. W. Townsend and Allen, 1907; C. W. Townsend, 1920).

Those, however, which leave for the north in spring, generally do so in April, and the breeding grounds in Alaska are usually reached in the second half of May. In the autumn the first flight reaches the wintering grounds in New England about middle to late September. These are mostly old birds. The main flights of females and young do not reach us until about October 20. Thus the Black Scoter is later than the others. In the spring the first flights appear off the Maine coast early in April, some time before the Surf Scoters and at least three or four weeks before the White-wings.

Very similar conditions obtain in Europe. As already remarked the southernmost record of its occurrence there refers to specimens taken in Rio de Oro on June 20, and others were taken in southern Morocco in early August. Irby (1883) mentions seeing a few at Santander, northern Spain, in May and June and over five hundred were seen in La Vendée, France, on July 31 and August 1, 1912 (Seguin-Jard, 1912). It can hardly be called a rare bird in summer about the British Isles (at times it is very numerous) and specimens have repeatedly been taken in Germany, Poland (Taczanowski, 1888; Prazák, 1898) and along the Finnish Gulf in the breeding season.

In spring the migrating birds generally leave the coasts of Great Britain, France, Belgium, Holland and Germany during April and May and return in September, October and November. Although it is chiefly an Atlantic coast bird, I have no doubt that some numbers go regularly to the Caspian, for it has been recorded as a migrant from many of the governments of interior Russia.

It is a remarkable fact that so many cross the whole of North America from their Alaskan breeding grounds to the Atlantic shores. We do not know where the main body cuts across Labrador on its spring flight. C. W. Townsend (*in litt.*) believes that most of them pass east along the south Labrador coast for he saw them constantly until mid-June. Nevertheless we know that they have been taken at Lake Mistassini migrating in mid-May and they are said to be common on the east coast of Hudson Bay. No doubt their overland journey occupies a wide band across central and southern Labrador, but we know little about this. Brewster, curiously enough, found this Scoter much commoner than both the others in autumn migration at Lake Umbagog, Maine. It may be that they cross farther south than the others on their southward journeys.

In regard to the question of sex proportions a word must be said. Many good observers in various parts of the world say that males are always greatly in excess, as many as seven to one. Such observations are scattered all the way from British Columbia (winter and spring) to the north shore of the Gulf of St. Lawrence, the Baltic coasts of Germany and in Holland. I have no notes of my own along this line but as far as I can see males go about as far south as females in the winter on the Atlantic coast (North Carolina). It may be that on their southern limits females and young are more plentiful than adult males. This has been suggested but observations have not been made on a large enough scale.

### GENERAL HABITS

OF the three species of Scoter which are found on both coasts of North America this, the Butter-bill or American Scoter, is far less numerous than either of the two others. It really can scarcely deserve the title of American for its only breeding range on our continent is a strip of extreme western Alaska. This is also the Common Black Scoter of English shooters and our bird differs from the European one, only in the color and shape of the bill.



The Black Scoter stands rather apart from the two other Scoters in habits, structure and geographical distribution. The structural differences were considered by W. deW. Miller (1916) as sufficient reason for placing this species in a different genus from the others. There are indeed sixteen tail-feathers in the Black Scoter as against fourteen for the Surf and the White-winged Scoter, while its trachea, even in the male sex is remarkable for its simplicity of form. Furthermore the outer primary of the Black Scoter is greatly emarginated, or "cut out" along the inner web.

It is most extraordinary that a good part of those birds that hatch in extreme western Alaska should take the trouble to fly across the whole of North America and spend the winter on our east coast, yet such certainly seems to be the case. We have no other American duck with a distribution at all resembling this.

These black sea-fowl are rather handsome in the full glory of their adult plumage, which shines a deep purple-black, with metallic cast which glints in the sunshine. The bill is so brilliant a yellow (especially in the American race) that males are conspicuous at long ranges. On the wing the yellow bill and absence of a white wing-patch identifies them fairly well. But on the water it is not so easy a matter because oftentimes the white speculum of the White-winged (Velvet) Scoter or the odd-looking colors of the Surf Duck are not easy to see.

Field identification of the females and young of all three Scoters is a matter which cannot be lightly entered into. There is no one prominent character that can absolutely be relied upon and confusion with immature Scaups is possible. In the present species the females and young have the side of the head uniform pale gray without the whitish spots before and behind the eye which are seen in the others. The body is short, chunky and smaller, and the legs, which can sometimes be well seen just as the bird dives, are black, or nearly so.

One of the peculiarities of all Scoters is the time of autumn migration of the old birds, especially the males, with some few (probably non-breeding) females. In this duck we find the first flights in Massachusetts coming the last week of September rather regularly, but the young come much later, seldom in large numbers until October 20. These dates are later (both old and young) than for the White-winged and Surf Scoters. It must be observed that the migration time of the sexes is different in the Scoters from that in any other group of ducks, perhaps on account of their late nesting habits.

Black Scoters are true sea ducks, able to feed in deep water, but they do not stay by preference in such a boisterous ocean as do Eiders and Long-tails. They are fond of some sort of protection and plenty of mussel-beds at a depth of twelve to twenty-five feet.

This, as well as the Brant Goose, was the subject of some of the most absurd beliefs that ever got themselves spread on the pages of natural history. Some time in the 15th century or perhaps before (see Buffon, 1785; and others) many wise men



asserted that Black Scoters had their origin in sea-shells, or from worms fostered in the rotten wood of wrecked ships! These curious myths were finally disposed of in 1680 (A. de Graindorge, *Traité de l'origine des Macreuses*, Caen, 1680). The true origin of the Brant had been demonstrated earlier than this (see also under Food Value).

WARINESS. This is considered by most sportsmen who have had a long experience as the wildest of the Scoter tribe. Perhaps it would be more correct to say that it is the least stupid of the three, for these sea ducks are not troubled by a highly developed nervous system if one may judge anything from their behavior. There is a most remarkable difference between the young birds, as we see them in October along our shores, and the flocks of older ducks with many adult males. These last not only fight shy of the New England "coot" shooter's boat and his flock of wooden or canvas decoys, but they hold farther offshore and do not follow the indentations of the coast so closely as their simple-minded offspring. While bedded at sea they are not easy to approach under sail, although you can sometimes do so. They are easy to scull to, especially small flocks of young birds, and a fast quiet motor-boat would no doubt prove destructive. Fortunately our law now forbids shooting from motor-boats.

It is a rather remarkable fact that all the Scoters have learned (?) to dread the land during their migrations in New England. I can remember when "Coot" were very common fowl in all our ponds during October, and older shooters told tales of extraordinary abundance. They used to cross Cape Cod and Cape Ann, Massachusetts, in great numbers but now it is rare indeed to see them. Mr. B. Preston Clark agrees with me in explaining this change of habit as really due to experience. He writes me: "As to the absence of Coot (Scoters) in ponds, my impression is that they have learned, like the deep-water seamen, that the chief danger at sea is land, and that safety lies in keeping away from this latter." He thinks the whole autumn migration has moved to the eastward during the last fifty years.

They are considered very wary on the breeding grounds in northern Russia (Seebohm, 1885) and in Iceland (Faber, 1822) as compared to other breeding ducks. It does happen, of course, that some of the wariest species lose a good deal of their fear of man on the breeding grounds while some of the dullest-witted ones become remarkably shy and retiring. Probably they are more concerned with natural enemies at that season than with man. All the Scoters seem to respond little to noise, such as gun-shots, acting a good deal like the Long-tailed Duck. Their response to a shrill whistle, which often makes them tumble out of the air as if pursued by a hawk, will be mentioned under Hunt.

Remarkable cases of possible feigning death are recorded for this as well as for other species of Scoters, and as I have seen one myself exactly like those recorded by Brewster (1924) I cannot help thinking that this behavior is something more than



can be accounted for by the mere effect of stunning. It is perhaps also more or less peculiar to the Scoter tribe. What happens is this: a bird only slightly wounded, although at the time supposedly dead, is laid carefully away and remains limp and quiet for a long period, when without the least preliminary movement it jumps overboard and usually manages to escape!

**DAILY MOVEMENTS.** It is difficult to make any general statement. Migrating bands work along our coast during the period of greatest autumn movement at almost any time of day, or even all day in stormy weather. Often the great migrations are over by mid-forenoon, but a shift of wind may start another wave at any time of day. These coasting migrants seem to travel mostly by day.

It is otherwise with the overland flights. All sea ducks perform their land journeys high up in the air and are seldom seen. Sometimes they will delay coming to water until after daylight, rarely not till eight or nine o'clock, and then they may be seen coming down from high up into large fresh-water lakes to rest *en route*, always from the north or northwest (Brewster, 1924) in our northeastern States.

Judging from what I have seen myself it is doubtful whether they are active night-feeders, although I cannot be dogmatic on this point. If one hunts bedded Scoters on some winter feeding ground he will find, as I have done, that they come to their favorite feeding ground early in the morning from some distance away, often from the open sea or the mouth of a large bay. On such morning and evening flights they are accompanied by other day-feeders: Golden-eye, Long-tailed Ducks and Eiders.

**GAIT, SWIMMING AND DIVING.** This, as well as the other Scoters, is seldom seen off the water except in the breeding season. During winter and especially toward spring, Eiders, Golden-eye, Scaup and even Buffle-heads are fond of "hauling out" on an ice floe, shoal, or beach, but Scoters scorn the land and probably do not dare to trust themselves upon it.

In captivity they are found to be exceptionally clumsy ashore and to have an erect attitude with the tail dragging.

When not feeding, the Black Scoter loves to drift about with its head sunk down between its shoulders or in calm weather with the bill tucked into the scapulars. Tired birds which come into our lakes on migration will scarcely move for hours at a time.

Millais (1913) and others have noticed that they do not like very broken water and will seek shelter in gales. I have never seen them outside Cape Cod, Massachusetts, in violent gales where the Long-tail is perfectly at home. As they often feed in very strong tideways, they are constantly drifting away from their favorite mussel-beds, and just as often fighting back to them, so that little parties are constantly on the wing.



Although many stories have been circulated about the great depths to which they can go for food, it is certain that they prefer moderately shallow water, say from ten to twenty feet. Those seen feeding at sea in twenty fathoms of water (A. Chapman, 1889) may have been working on a sunken ledge at a considerably less depth. They are probably able to reach bottom in thirty feet at the most. Dewar (1924) in his extensive series of diving records found no feeding done at over twenty-one feet while 81% of all dives were in water between seven and twelve feet.

Their ordinary time of immersion is eighteen to thirty seconds, but longer times, from thirty-five to fifty seconds and even more, have been noticed (Cordeaux, 1896; Dewar, 1924). A correspondent of Buffon tried the experiment of holding one under water for several minutes and the bird recovered without injury. I am inclined to think that most of the diving ducks can stand enforced immersion for four or five minutes without drowning.

All the Scoters, as well as the Long-tailed Duck and the Harlequin, often open their wings part way just as they take the dive, but how much the wings are actually used under water in healthy birds we do not know.

FLIGHT. Scoters belong among the general category of "quick-winged fowl." On their migrations along the coast all of them fly low, at times a foot or two above the water, then rising to twenty or thirty feet as if to get their bearings a little and again settling down close along the water. Some days, for no especial reason, as far as one can see, they fly higher, and the old birds are apt to go higher up and more offshore. On long overland journeys they go very high, probably often too high to see, and they travel always by night. It is a fact of some interest that in the old days a great many Scoters used to cut across the narrow parts of Cape Cod and were shot in numbers at such places as Shoot-flying Hill in Barnstable County. In northeast storms in late September or early October, and sometimes in fair weather a few used to cut across the base of Cape Ann, so that I occasionally saw them high over Wenham Lake, always going in a direction parallel to the coast-line. Nowadays these short cuts are less commonly made and it really does seem as though the birds had learned something.

It is a remarkable sight to see a large migrating flock of Black Scoters come tumbling out of the air from a great height, with a loud rushing sound that can be heard for a great distance. William Brewster (1924) says, "After circling or doubling for two or three minutes without perceptibly lowering their flight, the birds were accustomed to descend neither spirally nor on long inclines, but *almost vertically*, and with such velocity that the eye could scarcely follow them, making a rushing sound not unlike that of a strong wind blowing through pine tops, but perhaps still more like that of escaping steam. It could be heard distinctly more than a mile away, and I was sometimes awakened by it at daybreak, when sleeping in a tent by the lake



shore." He adds that during this descent they seem to keep their wings tightly closed until they are within one hundred feet or less of the water.

The formation of flocks is not at all regular: sometimes they migrate in long waving lines, more bunched in front and continually shifting, while at other times they come along in denser packs with little apparent order.

Scoters are sometimes killed against light-houses, especially when first constructed. They have been killed by telephone wires on Husum Island off the coast of Schleswig (Rohweder, in Naumann, 1896-1905) and they have flown against the lamps and windows of a Yorkshire factory (Cordeaux, 1896).

Large flocks are very common, although on our Atlantic coast less so than with the other two species. Seebohm (1885) mentioned seeing a flock estimated at 10,000, mostly old males, at the mouth of the Petchora River in mid-July. In the British Isles aggregations of thousands are not very uncommon. As they come south along our Atlantic coast flocks may be seen to vary in size all the way from eight or ten individuals to a hundred and fifty or two hundred.

The flight is silent or nearly so. It is usually easy to pick out Scoters on the wing by their dark color, direct bullet-like flight and coarse-looking heads and necks. Although the males of the different kinds are marked birds, it is not easy to tell immatures apart, except in the White-winged species, in which the wing-patches are very prominent.

**ASSOCIATION WITH OTHER SPECIES.** Although so similar in their habits the different kinds of Scoters keep fairly well sorted out, even on great migrations. They associate with each other a good deal more than with any other sea duck but this species is apparently more at home with the Surf Scoter than with the White-wing. Sometimes odd ducks of various sorts join their ranks, even Black Ducks (*Anas rubripes*) or Green-winged Teal. I have sometimes seen young birds associated closely with Scaups in the autumn.

Flocks of old birds, especially males, are apt to keep to themselves, even in the autumn, and on the spring flights there is very little mixing of any sort between old and young. Mackay (1891) and other good observers have noted this.

In Ireland Trevelyan (in A. Newton, 1907) found a Scoter's nest containing eggs of the Tufted Duck. This of course is a very unusual association.

**VOICE.** This is the only one of the Scoters that is ordinarily heard to make any noise while on autumn migration. Even so it can scarcely be called a noisy bird. The male's love-call, heard mostly in the spring or late winter, is characteristic. It consists of a musical, but mournful whistle, continually uttered in calm weather; perhaps also in rough weather, when it would not be audible. This sound is described by Allan Brooks as like the syllables *cour, cour, courlée, courlée*, the first two



slow, the others a little faster. Brewster (1924) has a great deal to say about the notes of the "Sleigh-bell Ducks" as he heard them on migration at Lake Umbagog in Maine. To him there was much of real music in a great chorus heard high in air. "It [the clamor] may be resumed a little later if the birds mount skyward to wheel and circle high over the lake. Then, of course, one hears only the *cree* notes which, softened by distance and blending in sweet, rather plaintive cadences, fall very pleasingly on appreciative human ears."

Many other writers have attempted to describe this note but it is useless to repeat. It is usually spoken of as a soft, musical whistle of several syllables. But the male, as in a good many other ducks, is able to give quite a distinct note, a rattling noise like *tuka-tuka-tuka-tuk* which he uses when scuttling along the surface in display.

The female has a harsh guttural note a good deal like that of the females of many diving ducks. I have often heard from a mixed flock as they were coming up to the decoys in October a slight chattering or cackling sound which may have come mostly from the young of the year but I cannot be certain about this.

Once while listening to a flock of young birds who were circling about a lake in New Brunswick, as if exercising their wings, I heard them (females?) uttering almost a quack, but at other times merely a hoarse, guttural chuckling. They were very noisy for Scoters.

FOOD. The food of all the Scoters is, so far as has been determined, very much the same, consisting of shell-fish of all kinds, especially black mussels, small sea-clams and razor-fish. At times they take in shells which are remarkable for their size. Mackay (1891) says they can swallow a scallop (*Pecten*) as large as a silver dollar, and he found mussels two and a half inches long in their crops. The average size, however, is much smaller, say from a five-cent piece to a quarter-dollar size. Witherby *et al.* (1919-22) gathered from various sources the following list of favorite food: shells of *Mytilus edulis*, *Cardium*, *Solen* and *Margarita*; on fresh water, *Anodonta*, worms, insects, small fish and pond-weeds. There are also records of grasshoppers and shrimps. Instances are on record of Black Scoters feeding on grain after a wreck (A. C. Chapman, 1887) while Gätke (1895) tells of their devouring small horse-beans in ten fathoms (!) of water after a wreck near Helgoland. These ducks when killed were white-fleshed and very fat without a trace of their usual fishy flavor.

But to return to the ordinary, every-day diet, which is what ought to be stressed in any account of food habits for too often the curious or abnormal diet is the one which is given prominence. In our U.S. Biological Survey (McAtee, MS.) a brief examination of thirty-eight winter stomachs from Massachusetts, California, and the coast of Washington shows that the common mussel formed almost the entire diet of the Massachusetts and California birds while the northwestern oyster (*Ostrea lurida*)



had been taken freely by those from Washington. No less than forty-five of these oysters were found in the gullet and gizzard of one of these Scoters. Besides mollusks, both bivalve and univalve, there were a few barnacles and crabs and the remains of one starfish. No vegetable food was taken.

**COURTSHIP AND NESTING.** Owing to the lateness of the nesting season the pairing does not begin until March or April. In some places, such as Comox, on Vancouver Island, males are far in excess of the females all winter, in fact up to the time of their leaving (A. Brooks, *in litt.*). Although males may be seen chasing the females on the wing even early in winter, the actual display is seen more frequently in April. Van Oordt (1913) was, I believe, the first to describe the display. Major Allan Brooks has frequently observed it and writes me that it seems to consist merely in the male's scuttling along the surface for a few yards, head almost under water, while he makes his rattling *tuka-tuka-tuka-tuk*. During this courtship period the musical whistling note described under Voice is heard continually on calm days. Under date of April 20 at Masset, British Columbia, Brooks notes as follows: "Males in preponderance still and flying about after single females. When on the water they chase each other a good deal, both sexes, the females taking hold of the males and pulling feathers out. A company of males in display carry the head high, fore part of the body out of the water, rear submerged and tail cocked up, their mouths open, uttering their mournful cry; water rough." He adds: "The *tuka, tuka* —, seems to be made only when the water is smooth. It may be made with the wings?"

William Brewster (1924) noticed distinct display attitudes among the Scoters of this species which visit Umbagog Lake in autumn. Besides the upright pose he spoke of a sort of "revolving dance," all the members of a flock following one another closely as they swam rapidly round and round in a great circle, each bird using its broad-webbed feet so energetically as to keep most of its body above the surface, although its wings were never opened.

Sportsmen have often found that in the spring when the female of a pair is shot the male boldly returns to the dead body of his mate, but if the male is killed the female shows no concern whatsoever.

The spring migration of all the Scoters is extremely late, just as the autumn migration is exceptionally early. This applies perhaps even more to the White-winged Scoter than it does to this species. So many of these birds never get to the breeding grounds at all that the movements of the species as a whole are bound to be puzzling. In Ireland and Scotland they are the last ducks to nest, later even than the Red-breasted Merganser or the Tufted Duck, eggs being found in the first half of June (earliest, late May). In Iceland eggs are rare before early June, the usual season extending from mid-June to early July (Hantzsch, 1905). In the colder regions of northern Russia, Seebohm (1885) found no eggs before the end of June. Alaskan



dates are very few. Dall and Bannister (1869) took eggs at Pastolik on June 17, and Nelson (1887) found fresh eggs on August 3 and downy young on September 9!

The nest is always, so far as I know, located near fresh water, either on the shores of large deep lakes or on islands in them. Seebohm (1885) says that on the Petchora he never found the nest on the islands of the delta, but either near a lake, on the tundra, or on the sloping river-bank, concealed beneath the dwarf birch or willow scrub. Dall and Bannister (1869) found a nest in a bunch of willows on an island in an Alaskan lake. The nest is never far from the water and is usually little more than a hollow scratched in the ground and lined with various substances, such as dead leaves, little twigs and grass or moss.

The complement of eggs is from six to ten, the usual number being eight. The eggs are creamy to buff (pale grayish buff, according to Seebohm) and average 65.26 by 44.93 mm. in size. The length varies from 59 to 72 mm. and the breadth from 42 to 47.5 mm. (Hartert, 1920a). The nest-down, which is usually, but not always abundant, is said to be very much like that of the Mallard, but more gray (Seebohm, 1885). The down-color varies so much that it is scarcely ever diagnostic. Witherby *et al.* (1919-22) described it as sooty brown with inconspicuous light centers.

The incubation period is long. The most definite observations were made by Trevelyan (London Field, July 15, 1905, and in A. Newton, 1907) at a nest he found on an Irish lough. His estimate was thirty-two to thirty-three days. Hantzsch (1905) gives four weeks as a rough figure.

Males commence to flock together as soon as the females begin to sit. In some places they stay on the lakes, but ordinarily they collect on the coast. Great flocks of adult males have been seen near the breeding grounds in this season. At times these males, like the males of the Surf Scoter, make very early southward journeys, in which case they must go through the moult far south of the nesting grounds. It is a fact that flocks of moulting birds, whether breeding or not we do not know, may be found anywhere in European waters in August, or even much later (Cecil Smith, in Seebohm, 1885).

STATUS. Some sportsmen think this Scoter is not so common as thirty or forty years ago on the North Atlantic coast. It only represents at best about 7% to 10% of the combined numbers of all three species and I doubt whether it has changed greatly in recent years. There is some reason to think that the White-winged and Surf Scoters have increased since spring and late-winter shooting was stopped. At the same time coast shooting in general has become less popular for reasons suggested under Hunt. The proportion of this species to the others on the Pacific coast is hard to determine but it is not really plentiful (relatively speaking) anywhere. In Puget Sound and along the south shore of the Alaskan peninsula it is said to be numerous at times. It is curiously scarce in southeastern Alaska, according to A. M. Bailey





DISPLAY ATTITUDES

(Upper) SURF SCOTER

(Middle and Lower) BLACK SCOTER







(MS.), and all along the coasts of Washington, Oregon and California. Perhaps a good many go to the Siberian and Japanese shores, for it is spoken of by Kuroda (*in litt.*) as an abundant species off northern Japanese coasts all winter.

In order to give an idea of the size of the hosts which pass our Massachusetts points, I shall give a few extracts from the Clark shooting diary which has been kept religiously at Cohasset since the late fifties. One must bear in mind that less than 10% of these are Black or American Scoters. Mr. Matthew Luce of Cohasset assures me that he has seen not less than twenty-five to thirty thousand Scoters pass in a single day, six hundred to nine hundred flocks, all the way from a few to two hundred or more in a flock. This is borne out by many entries in the Clark log which run far into the thousands, even to 100,000 in a single day. For the years 1894 and 1895 I have jotted down some of the more remarkable days. They are as follows:

*Season 1894*

August 22: 300 went by.  
 September 2: 100 went by.  
 September 11: 4000 to 5000 went by.  
 September 30: 10,000 went by.  
 October 3: Thousands of "Coot" went by.  
 October 7: Good flight.  
 October 11: 10,000 birds went by.  
 October 13: 100,000 birds went by.  
 October 21: A good many.  
 October 22: A large flight, but wild.  
 "A very good, average season, usual number of birds, etc."

*Season 1895*

September 18: 1000 Coot.  
 September 22: 1000 Coot.  
 September 28: 15,000 Coot seen.  
 September 29: Immense flight; fifty or sixty thousand.  
 October 12: 15,000 went by.  
 November 25: 10,000 went by.  
 "A very poor season, unfavorable winds, etc."

A general idea may be gained from these figures, which are careful estimates. Fifty thousand in a single day is mentioned several times. Mr. Bonnycastle Dale (*in litt.*) estimated that 150,000 went south past Nova Scotia points in 1921, a small part, no doubt, of the actual.

This is a much more abundant duck on the coast of Europe than it is with us and so far as I know, has not grown any scarcer in recent years. There are simply enormous numbers off the north and east coasts of Ireland, in the English Channel and off the northern French and the Dutch coasts. In some places where mussels have become an important article of food they are said to have become scarcer. W. Thompson (1851) noticed this in Drogheda Bay, Ireland. No doubt the same thing may be true of parts of the French coast.



ENEMIES. No doubt the Black Scoter has the same enemies as have other far-northern breeding ducks. Birds such as the Arctic Skua and the Sea Eagle, as well as Arctic foxes, cause a certain amount of destruction. The young of the little colony on the lake in Ireland were much persecuted by Black-backed Gulls and by pike (Seton Gordon, London Field, August 10, 1918). It is a fact not generally known that all the Scoters as well as many other diving birds, such as Grebes, Loons, Cormorants, Razor-billed Auks, Guillemots, Herring Gulls, Scaups, Mergansers and even European Widgeon are eaten by the goose-fish (*Lophius piscatorius*). Dr. H. B. Bigelow tells me that these wide-ranging scavenger fish occur on both coasts of the Atlantic, grow to three or four feet in length and are said to reach seventy pounds in weight. Seven ducks have been taken out of the stomach of one of these fish, and six Scoters (sp.?) out of the stomach of another.

Naumann (1896-1905) has recorded eleven species of intestinal parasites that have been found in this Scoter. Jameson and Nicoll (1913) report finding no less than fifteen species of trematode worms in the intestines, in the *bursa Fabricii* and in the respiratory tract. They also find that this species probably acts as an intermediate host in the life of the pearl-producing organism of the common edible mussel (*Mytilus edulis*).

Scoters are particularly exposed to dangers of oil pollution, for great numbers feed in the entrances of crowded harbors, where conditions are far from ideal.

DAMAGE. The destruction of the edible mussel, which forms such an important article of food in France, has never been estimated, so far as I know. In Massachusetts these Scoters take some edible shell-fish, including small scallops (*Pecten*). A few stomachs collected by the U.S. Biological Survey showed these shells present in the proportion of 20%. The Scoter is, however, too scarce in New England to do any real damage.

FOOD VALUE. The flesh, particularly in winter, is very strong, but I have often eaten young birds before they reached the salt water, that were not nearly so fishy. The young birds on our Atlantic coast, especially in New England, are still much appreciated by those who have the patience and courage to stew them in the proper way. The liking for strong sea-food seems to be characteristic of those who live on the coast. The chief advantage of the Scoter as a game dish lies in its abundance and the ease with which it can be secured. I confess I am not able to appreciate it.

The art of cooking Scoters seems to be dying out very fast in this part of the world. William Brewster tells of an ingenious way of baking them in a bean-hole in the North Woods and subjecting them to an hour and a quarter's treatment of such camp cookery. He says, "Before being consigned to this backwoods oven, the bird was stuffed with sage, onions, and bread crumbs, and wrapped in several thicknesses



of stout brown paper or birch bark, smeared with butter or lard . . . When taken out and unwrapped, it looked more like a boiled than a roasted Duck, for the skin remained smooth and moist. Scoters cooked in this fashion were invariably tender, juicy and deliciously flavored, even when old or excessively fat."

In France the very old traditions in regard to the sea origin of the Scoter resulted long since in a curious dispensation for the Catholic Church. Since the "Macreuse" was supposed to be bred from shell-fish and worm-like animals living in the rotten timber of wrecked vessels, it was considered to be as much a fish as a fowl, and the consumption of its flesh was allowed in fasting periods. It has been suggested that the very name "Macreuse" is derived from *macer*, which is original of the French *maigre*. Writers of the 15th and 16th centuries even went so far as to assert that the Scoter was cold-blooded, and these myths were not dispelled until the later 17th century.

HUNT. It seems that here in New England Scoter or "Coot" shooting, as it is always called, is not nearly so popular a sport as it used to be. This may be due to several causes. First, the taste for strong-flavored game is dying out. At one time, of course, our ancestors, particularly in the old country, were fond of such birds as herons, bitterns, and gannets. Our tastes are now more refined or our appetites less rugged, I scarcely know which. But perhaps the real reason is that the hardier pastimes have more or less gone out of vogue and their places are taken by professional base-ball, golf, and other games. The present generation, reared beside steam radiators, has little inclination to rise at three or four o'clock, pull out to sea in a "cooting" dory and handle a big fleet of decoys.

Although it is a good many years since I have done much of it, I always try to make at least one visit to the shore in autumn, tie off outside the Cohasset rocks and watch the varied bird-life that streams past that point in October, converging from several sources. Here, as one rocks gently in his gray dory, with a flock of forty or fifty wooden decoys, anchored in several strings of a dozen or so each close to leeward of him, he may see on a proper morning all sorts of fowl. From the 5th to the 25th of October he can watch the migration at its height, and besides Scoters he may often get a chance at Long-tails, Mergansers, Scaup of two species, Whistlers (Golden-eye) and Brant Geese. More rarely a few Canada Geese, Black Duck or Red-heads are brought in, and occasionally Hooded Mergansers, Eiders, Harlequin, Canvas-back and even Carolina Ducks.

A careful perusal of the interesting shooting-log of the Clark family at Cohasset, Massachusetts, kindly loaned to me by Mr. B. P. Clark, reveals interesting points, only a few of which I can mention. The best shots, and there were several very deadly ones, averaged in some years forty per cent of killed with each one hundred shells, but most of the regular shooters were not over twenty-five or thirty per cent



perfect. Even this is extremely good shooting, taking into account the great number of cripples that have to be shot over. Up to 1871 the largest number ever brought in by two guns (one boat) in one day was forty. In 1872 the record was forty-eight; in 1881, fifty-one; in 1883, fifty-three; and in 1893, sixty-seven. In 1894 Messrs. Luce and Meade brought in eighty-five on October 11; and in 1898 Messrs. Luce and Clark shot eighty-eight on October 10. The actual double record was made by E. H. Clark and M. Luce who on October 8, 1910, brought in one hundred and forty-eight birds!

The records for one gun stood at thirty-three in 1874, thirty-eight in 1883, and fifty-eight in 1892. In 1886 one gun brought in sixty-one, while there is a record at Brant Rock close by, for sixty-six in one day. According to the Clark log the greatest number of Scoters ever taken in one day was at Hyannis, Massachusetts, about May 1, "many years ago" when J. N. Frye killed two hundred and thirty-seven "bedded fowl" and came back at noon! The biggest bag at Cohasset for one gun was made by Ellery H. Clark who on October 17, 1911, accounted for ninety-eight Scoters. This Cohasset shooting (and there are many other places like it such as Small Point, Maine; Monument Beach, Plymouth, etc.) was done mostly in autumn. Other places south of Cape Cod were famous for wintering grounds, and if one knew just where some big flock was feeding he could get fine shooting at any time during the winter from a boat over decoys. Often merely a string of pig bladders, trailed out behind the boat, was sufficient inducement.

Then there are a good many rocky points along the Maine coast where one can obtain fair shooting from land, especially where the flight passes between islands. I have shot both Eiders and Scoters off the tip of Monomoy Beach, Massachusetts, in a southerly gale without any decoys, the shot birds dropping on the sand.

In the spring there were various places where fine shooting could be had well up into the middle of May, when Scoters were starting overland and came up the narrows at such places as Hog Island, near the head of Buzzards Bay. A string of boats formed across the narrows and as the great flocks came along high up, they were greeted by a deafening whistle, produced by inserting the fingers in the mouth. As this sound reached them, whole or parts of flocks would tumble out of the air and sometimes pass within half a gun-shot, one of the most extraordinary sights I have ever witnessed in the world of wild-fowl. Much powder was burned on these spring flights but meager indeed were the results. Millais is wrong in speaking of rigging for Scoters with a "battery" in American waters. I never heard of the practice. Such an expensive and cumbersome rig is used for the better-class diving ducks and mostly on enclosed waters. Of course some Scoters are shot from batteries (sink-boxes) and I have done so myself, but only incidentally.

Any one interested in shooting should read William Brewster's (1924) account of paddling up to bedded Scoters at Umbagog Lake in a canoe properly dressed with



grass and branches. He describes in a charming manner his many hunts and the varying types of behavior he has seen in ducks approached in this way. Sometimes they were absurdly tame, at other times, especially in stormy or windy weather, very wild indeed. It was always well, he said, to keep on trying the same flock, no matter how wild they acted at first, for after several vain attempts it was often possible to get right among them.

As I said before, fewer Scoters are shot than formerly on the Atlantic coast and none on the spring flight. In the north, in Labrador especially, moulting Scoters are sometimes surrounded by boats and killed in great numbers. The great duck drives on the New England coast probably referred mostly to moulting non-breeding Scoters, as well as Eiders. There are times when they can be taken on the coasts of Europe in this same way (see a notice by Seguin-Jard, 1912, concerning over five hundred Black Scoters taken July 31 and August 1 on the shores of La Vendée, France).

The industry of taking Black Scoters by means of the horizontal net must have been an important matter in France at one time and is mentioned by many writers. The eating of the Black Scoter's flesh seems to have now gone out of fashion for, as Ternier and Masse (1907) remark, these ducks are no longer seen in the markets in any numbers. A good first-hand account of the French methods of netting is to be found in *Shooting Adventures, Canine Lore and Sea-fishing Trips*, by "Wild Fowler" (1879).

I do not know that many Scoters are shot on the English coasts, nor are they much disturbed on our Pacific coast, where good ducks are more common than they are in New England.

**BEHAVIOR IN CAPTIVITY.** I have never happened to see any of the Scoters in confinement. Excepting the Ruddy Ducks, they are perhaps as difficult as any to keep. They get along less well than Smews, Golden-eyes or Eiders and evidently require a natural diet in order to remain in good health more than a few weeks. A correspondent of Buffon's, M. Baillon, made some rather interesting notes on a Black Scoter which he kept for several months in 1781. He was surprised to find that it could walk on land, perhaps even better than the Scaup. He fed it on water-soaked bread and small shells. After a short time it became very tame. He noticed that it was never active, never bathed itself like other ducks, and that it was of a melancholy disposition. The voice he described as a sort of soft, clear whistle, somewhat like the first note of a "transverse" flute. This bird finally died from sore feet, which were punctured by the gravel so that the nerves were actually exposed. It became helpless and died soon after.

Thienemann (1903) made careful observations on captive birds and came to the conclusion, from a study of the moult and the sex organs, that they did not breed



until at least two, if not three years of age. At first they were very wild, but he noted that they always avoided striking the wire fence under water. They did not use the wings under water and their feeding was a sort of rapid crawling along the bottom. They almost never brought food to the surface, and ordinarily remained under the surface sixty-five seconds. Just as they reached the surface he heard the same sobbing noise of expelled air that he noted in the Long-tailed Duck. When making a long dive they would let out a stream of bubbles behind, formed, he thought, by pressing the air out of the feathers. It was some time before he could teach them to take food on the land and they rarely went ashore while in good health. He fed them a good deal of fish, of which they showed a marked preference for the salt-water varieties.

A specimen in the London Gardens is said by Lilford (1895) to have been kept entirely on fish. This is probably the one which is recorded by P. C. Mitchell (1911) as having lived thirty months.

Mr. St. Quintin (1910; in Millais, 1913), who has specialized on all the sea ducks, has described his experiences with the Black Scoter. He found Scoters more difficult to acclimatize than Eiders, Scaup or Golden-eyes. A pair which he received late in the spring went through the summer with clipped primaries, moulted these out and escaped in the autumn when the new feathers had grown. They were fed on fish, bread and barley, and Spratt's meal, scalded.

HYBRIDS. The only hybrid recorded, so far as I know, was a cross between the Black Scoter and the European Widgeon (Leverkühn, 1890).

#### GEOGRAPHICAL RACES

##### BLACK SCOTER

##### *OIDEMIA NIGRA NIGRA* (LINNÉ)

*Anas nigra* Linné, Systema Naturæ, ed. 10, vol. 1, p. 123, 1758.

*Oidemia nigra* Fleming, Philosophy of Zoölogy, vol. 2, p. 260, 1822.

CHARACTERS: Bill black in the male but the middle part of the culmen between and around nostrils and forward almost to the nail yellow or orange-yellow. Nail not markedly hooked.

Bill of female black or nearly black and seldom with yellow spot between nostrils. Nail very little hooked.

RANGE: Breeding in Ireland, Scotland and Iceland through northern Europe and western Siberia to the Taimyr peninsula and in winter to the coasts of Europe, the Mediterranean, Black and Caspian Seas.

##### AMERICAN BLACK SCOTER

##### *OIDEMIA NIGRA AMERICANA* SWAINSON AND RICHARDSON

*Oidemia americana* Swainson and Richardson, Fauna Boreali-Amer., vol. 2, p. 450, 1831.

*Fuligula (Oidemia) americana* Nuttall, Manual Ornith. U.S. and Canada, vol. 2, p. 422, 1834.



*Melanitta americana* Eyton, Monograph Anatidæ, p. 144, 1838.

*Oeidemia americana* Pucheran, Rev. et Mag. de Zool., ser. 2, vol. 2, p. 635, 1850.

*Oidemia minor* Lesson, *fide* G. R. Gray, Hand-list Genera Birds, vol. 3, p. 89, 1871.

*Anas wilsoni* Giebel, Thesaurus Ornith., vol. 1, p. 365, 1872.

*Oedemia nigra*, var. *americana* Ridgway, Ann. Lyceum Nat. Hist. New York, vol. 10, p. 390, 1874.

*Fuligula nigra americana* Seebohm, Hist. British Birds, vol. 3, p. 602, 1885.

**CHARACTERS:** Bill of males black, but the whole basal part of culmen, including the knob, to a little forward of the nostrils brilliant yellow. Nail arched or hooked downward very much more than in the European race.

Females with the bill more or less marked with yellow about the nostrils and having the nail hooked as in the male.

**RANGE:** Breeding in western Alaska and northeastern Asia and in winter migrating to both Pacific and Atlantic coasts, as well as to parts of the interior of North America. In Asia south to Japan and Korea.



# WHITE-WINGED OR VELVET SCOTER

*OIDEMIA FUSCA* (LINNÉ)

(Plates 74, 75)

## SYNONYMY

*Anas fusca* Linné, Systema Naturæ, ed. 10, vol. 1, p. 123, 1758.

*Anas notata* Boddaert, Tabl. des Planches Enluminées, p. 58, 1783.

*Anas fuliginosa* Bechstein, Naturges. Deutschlands, vol. 4, p. 962, pl. 31, fig. 1, 1809.

*Anas carbo* Pallas (in part), Zoogr. Rosso-Asiatica, vol. 2, p. 244, 1811.

*Oidemia fusca* Fleming, Philosophy of Zoology, vol. 2, p. 260, 1822.

*Melanitta fusca* Boie, Oken's Isis, p. 564, 1822.

*Platypus fuscus* Brehm, Lehrbuch Naturges. Europ. Vögel, vol. 2, p. 822, 1824.

*Fuligula fusca* Bonaparte (in part), Ann. Lyceum Nat. Hist. New York, vol. 2, p. 390, 1826.

*Melanitta horischuchii*, *Melanitta megapus*, *Melanitta platyrhynchos* Brehm, Oken's Isis, p. 998, 1830.

*Melanetta fusca* Bonaparte, Icones Avifaun. Ital., Uccelli, Introd., p. 17, 1841.

*Oedemia fusca* Bonaparte, Cat. Met. Uccelli Europ., p. 73, 1842.

*Oedemia horischuchii*, Vogelfang, p. 383, 1855.

*Oedemia platyrhynchos*, *Oedemia megapus* Brehm, Vogelfang, p. 384, 1855.

*Melanonetta fusca* Heine and Reichenow, Nomencl. Mus. Heineanum Ornith., p. 349, 1890.

Additional synonymy under Geographical Races.

## VERNACULAR NAMES

*English:* Velvet Scoter, Velvet Duck, Great Black Duck, White-winged Scoter, White-winged Coot, White-winged Surf Duck, Black White-wing, Gray White-wing, May White-wing, Eastern White-wing, Pied-winged Coot, Bell-tongue Coot, Brass-winged Diver, Uncle Sam Coot, Bull Coot, Brant Coot, Sea Brant, Assemblyman, Channel Duck, Siwash Duck, Black Surf Duck, Klondike Mallard, Sea Coot, Squaw Duck, Fish Duck, Clam Digger.

*German:* Samt-ente, Samttauch-ente, Samttrauerente, Mohrente, Moorente, Mod-erente, Braun-Spiegelmoor, Russfarbige Ente, Fliegenente, Turpane, Mader-ente, Rheinmoor.

*French:* Grande macreuse, Double macreuse, Macreuse brune, Fuligule brune, Morillon lugubre, Macreuse lugubre, Mourette lugubre, Gros pilet noir, Macreuse veloutée, Canard brun, Negrasso, Brunasso, Melanette brune, Gros noir.



*Portuguese:* Pato do mar.

*Spanish:* Morell del mar.

*Basque:* Atabeltz andia.

*Lapp:* Skoarra.

*Polish:* Kaczka uhla.

*Italian:* Orco marino, Germano di mare, Anitra nera, Moraeton, Negrotton, Cherso nero, Moretta, Annia scüa, Buscin de Spagna, Doubla macrosa, Anatra di mare, Anari a caparuccia.

*Dutch:* Flöielsand, Groote Zee-ëend, Zwarte Duiker.

*Danish:* Flöielsand, Hvidvinget-himmelhund, Stor Himmelhund, Svartand, Torsk-and.

*Norwegian:* Hei-and, Svorta, Sadelsvorta, Svaertan, Svartand, Svartorre, Savorre, Havaare, Korri, Sjöorre.

*Swedish:* Svärta, Svärtkar, Svärtgubbe, Svartand, Svärtkäring, Doppand, Spansk tiste, Sjöorre.

*Finnish:* Pilkkasüpi, Kolso, Korri, Sortti, Kulmunen, Meriteiri.

*Russian:* Nyrok-sirok, Svirok, Turpan, Cherny turpan, Golovna, Tulpan, Turpan cherninshka chernuha.

*Gaelic:* Tunng ghlenst.

*Esthonian:* Vella pihle.

*Croatian:* Baršunasti turpan, Patka kalašica.

*Czech:* Kachna temna.

*Hungarian:* Füstös récze.

*Bashkir:* Irok, Kara urdek.

*Tunguse:* Nevodchik, Nopokeli.

*Yakutsk:* Andi.

*Ostiak:* Tulbuk.

*Japanese:* Kuro-tori.

*Mongolian:* Ukir-nogossun, Ukir-karashi.

*Chipewyan Indians:* Mookataw-sheep.

## DESCRIPTION

*Note:* For detailed description of the plumage, and especially of the bills of the various races of this species see under Geographical Races at the end of the account of the species.

**ADULT MALE:** General color nearly uniform dull black, darker above. A small white crescentic patch covers an area below or even behind the eye. There is a large white wing-speculum formed by the secondaries and the tips of the greater coverts.

Iris pale bluish gray to chalky white with an outer dusky ring. Legs and feet dark orange vermilion on the inside surfaces, more crimson on the outside; webs dusky black. Bill: See under Geographical Races.

Wing 269–293 mm.; bill 37–50; tarsus 48–52.



Weight 3 pounds, 12 ounces to 4 pounds, 9 ounces (maximum, Trumbull, 1893) (1.70 to 2.07 kilograms).

**ADULT FEMALE:** General color brown or gray-brown, lighter below. On the sides of the head are usually found two rather poorly defined whitish spots. One of these is between the eye and the bill and the other below and behind the eye. In some specimens, probably old, the whole head and neck become very dark and the light areas reduced or absent. Secondaries white and tips of greater coverts often white, forming a large white speculum as in the male. Color of lower parts varies considerably: occasionally one sees specimens that have the whole abdomen nearly white, with the breast dark brown.

Iris brown. Legs and feet duller and paler-colored than in the male. Bill dusky black or brown-black.

Wing 251–266 mm.; bill 38–43; tarsus 46–48.

Weight 2 pounds, 12 ounces to 3 pounds, 6 ounces (1.24 to 1.53 kilograms).

**MALE AND FEMALE IN FIRST (JUVENAL) PLUMAGE:** Like adult female but lighter-colored both above and below. The mantle and scapulars are more uniform, lacking lighter edges to the feathers, and the abdomen is much lighter in tone, sooty brown to almost whitish. The two light-colored face-patches are more prominent in this plumage than in the adult female and the tail shows the usual blunted tips which are present in the young of all of the ducks.

Iris brown. Bill slate black to greenish black.

**IMMATURE MALE:** The first or juvenal plumage may be carried practically without change during the whole of the first autumn and winter but black feathers usually begin to grow by November. These new black feathers soon obliterate the whitish face-patches and later on they invade other regions, such as the sides, flanks, upper breast, mantle, and scapulars. Nevertheless, although the whole head may be black, the young male, during the first winter, never acquires the pure white “lower-eyelid” mark of maturity. The abdomen also remains brown and is apt to fade out and become very light-colored toward spring. The color and size of the bill change during the first winter and soon reach an almost adult condition.

Weight (in autumn) 2 pounds, 12 ounces (1.24 kilograms).

**MALE IN SUMMER:** Looks very much as in winter but the whole plumage is duller and browner with many worn and faded feathers. The head is dirty brownish and the area around the base of the bill may be a dirty gray color. The lower-eyelid spot is present as in winter. There is no eclipse plumage as commonly understood, that is, no approach to an immature type of plumage. Millais describes an old male shot in August with whitish-brown patches on the face, giving the bird a very female look. These are not present in the mid-summer specimens I have at hand.

**ADULT FEMALE IN SUMMER:** The mantle and scapulars have a peculiar barred appearance in July and August owing to light-colored or abraded tips on the feathers of these regions. The white face-patches are a little more prominent than in the winter plumage.

**DOWNY YOUNG:** Differs from the young of the Black Scoter through the presence of a large white patch extending from chin and throat over the lower part of the face and neck and almost meeting its fellow on the other side in the region of the occiput. This white facial mark gives the young a general resemblance to that of the Golden-eye or the Buffle-head, but there are no white dorsal body-spots. In the young of the White-winged Scoter, the whole upper side is a uniform dark brown to sooty black, while the lower surface is white, tinged with gray.





WHITE-WINGED OR VELVET SCOTER

Adult Male

Adult Female

Immature Female

Immature Male







## DISTRIBUTION

THE Velvet Scoter has a distribution very similar to that of its near relative, the Common Scoter, and, like this, is found on all three continents of the northern hemisphere. But this species has a central continental breeding area in North America and is more commonly found inland everywhere on migrations.

## BREEDING RANGE

IN Europe the Velvet Scoter is not known to occur at any season in Iceland, nor has it ever been conclusively shown to nest anywhere in the British Isles, though specimens are not infrequently seen in summer (H. Saunders, 1899; Millais, 1913; Witherby *et al.*, 1919-22; etc.). On the **Norway** Continent it breeds in large numbers on the fells of southern Norway (south to Christi- **Sweden** ania) and thence northward to Varanger and the Finland border (Collett, 1873; H. J. Pearson, 1899; Millais, 1913; Schaanning, 1913). In Sweden also it is a common breeding bird, the range extending south to Blekinge and Kalmar, and including the islands of Öland and Gothland (Wallengren, 1853, 1854; Nilsson, 1858; Meves, *fide* Dresser, 1871-81). In Finland it **Finland** nests everywhere excepting in the treeless areas, from the northern parts of Lapland (common at Utsjoki and Enare) south to the Gulf of Finland (Palmén, 1876). Dresser (1871-81) found it nesting at Uleaborg and says it does so commonly on the Åland Islands, at Abo and Viborg, while Palmgren (1913) lists it as a breeding bird at Helsingfors. In the interior it is, however, less abundant as a breeder than the Common Scoter. Both S. A. Davies (1905) and Montell (1917) speak of it as not very common on the upper Muonio, while from Finnilä's (1913, 1914) observations it appears to be quite uncommon at Sodankyla and Kuolajarvi. About Kallevesi Lake (Kuopio) it is exceedingly rare in summer (Suomalainen, 1908) and probably does not nest anywhere on the inland lakes of Finland proper.

On the south side of the Gulf of Finland this species nests regularly in Esthonia and in Livonia (Latvia), according to Loudon (1909), and on the island of Oesel it is reported as an **Baltic** abundant breeder (Stoll, 1911). In Poland a few are now and again seen in summer **States** (Taczanowski, 1888) and it has been known to nest near Brody in eastern Galicia **Poland** (Prazák, 1898) as well as about the marshes of Pinsk (Zarudny, 1886). There appears **Russia** to be an isolated nesting area on the south side of the Caucasus. Radde (R. Blasius, 1904, p. 31) received a clutch of eggs from Lake Tabizchuri and de Filippi (Schalow, 1876) found it very common on Lake Gokcha in summer. Nesterov (1911) also speaks of it as a rare breeder in (Russian) Armenia. In central Russia the species is said to nest rarely in Moscow (Menzbier, 1883) and possibly in Novgorod (Bianchi, 1910). It has not yet been reported breeding in the Petrograd government, but it does so about Lake Ladoga (Palmén, 1876; Zarudny, 1886), along the coasts of the White Sea, and at many localities on the Kola peninsula, even on the Murman coast (Alston and Harvie-Brown, 1873; Rae, 1881; H. J. Pearson, 1904; Witherby, 1900; Bianchi, 1902b). It is rare at Archangel (Seeböhm, 1882a) and to the eastward, on the lower Petchora, it appears to be exceedingly scarce. Farther south, however, it is reported to nest very commonly in Perm (Harvie-Brown, 1878; Zarudny, 1886), possibly in Kasan (Russki, 1893) and certainly in Simbirsk (Buturlin, *fide* Hartert, 1920a).

Off the Arctic coast of Europe, von Heuglin (1872, 1874) claims that he found the Velvet Scoter common and evidently breeding in eastern Spitzbergen, and plentiful also on Waigats and Nova Zembla. These statements are not borne out by the observations of later explorers. **Arctic** The only other record of its occurrence in Spitzbergen that I can find is that of Mathey- **Europe** Dupraz (1912) who, in the summer of 1906, took two specimens in Research Bay and Advent Bay. Smirnow (*fide* Schalow, 1905) met with it in June on Kolguev, and Buturlin (*fide* Hartert, 1920a) states that small numbers nest on Nova Zembla.



On the eastern side of the Urals this Scoter nests as far south as Kurgan, on the Trans-Siberian Railroad, and commonly about Tara on the Irtysh (Ushakov, 1913). No doubt it nests throughout the regions along the Ob, for Finsch (1877) found it near Obdorsk about the middle of July and recorded it nesting on one of the tributaries of the lower river. Toward the east it nests in small numbers about Tomsk (Suschkin, 1913; Johanson, *Mess. Ornith.*, 1912, p. 287). In this region the breeding range extends farther south than elsewhere, for some numbers nest in the Russian Altai (Elwes, 1899; Suschkin, 1913, 1915) and also on various of the mountain lakes of the Sajon range (Tugarinov, 1913). According to Suschkin (1913) it breeds about Minussinsk on the upper Jenesei. I presume that it does so throughout the basin of the latter river, for Popham (1897) met with it at Dudinsk near the mouth. Its status farther east is very vague. Radde (1863) says he has seen large numbers of adult females in summer in northern Mongolia, but these may have been non-breeding birds. Von Bunge and von Toll (1887) met with it late in May near Verchojansk, and Buturlin (1908) includes it in his list of species which nest on the middle Lena, Wiljui or Aldan. On the lower Kolyma it was found common after June 4 (Thayer and Bangs, 1914). Perhaps small numbers nest all along near the north Siberian coast, for Nelson (1883) saw many at Cape Wankarem early in August, and others along the Siberian coast south of Bering Strait. Pallas (1831) says it nests in Kamchatka, and Bianchi (1909a) has reported it common there in spring. Others have been taken on the Commander Islands in May (Hartert, 1920). Along the coast of the Sea of Okhotsk it is fairly common and breeds in small numbers (Pallas, 1831; J. A. Allen, 1905). Possibly it may nest as far south as Saghalin Island (Nikolski, *fide* Lönnberg, 1908).

This Scoter has not yet been found nesting on the Aleutians, though it was observed in Unalga Pass in June (A. H. Clark, 1910). On the mainland small numbers are said to nest along the coast at the mouth of the Yukon and on Kotzebue Sound (Nelson, 1887) but no actual nests seem to have been collected. It is doubtful if it nests on the Arctic coast of Alaska, but it has been noted about sixty miles east of Point Barrow (Seale, 1898) and about Demarcation Point (W. S. Brooks, 1915). In southern Alaska it is abundant in summer, especially about Sitka and elsewhere in southeastern Alaska (Bishop, 1900; J. Grinnell, 1900; Bailey, MS.), but these are probably all non-breeding birds. Bischoff (*fide* Nelson, 1887) is said to have taken eggs there. In the interior of Alaska the species is noted along the lower Yukon (Dall and Bannister, 1869) and it has been found nesting at the mouth of the Porcupine River and at Fort Egbert (U.S. Biological Survey) which is apparently its western breeding limit.

In northwestern Canada it is fairly common about the MacKenzie delta and breeds on the barrens along the Anderson River (Stefánsson, 1913; R. MacFarlane, 1908; R. M. Anderson, *in litt.*). The range on the Arctic coast extends eastward to Liverpool Bay, Cape Bathurst and Franklin Bay (R. M. Anderson, 1917; U.S. Biological Survey). Throughout the MacKenzie basin it is a rather common species. Preble (1908), Seton (1911) and earlier investigators met with it all the way from the delta south to Great Slave Lake as well as along the south shore of Great Bear Lake, along the Grandin River, about Fort Rae, eastward to Artillery Lake and on the south shore of Great Slave Lake. It appears to be most abundant about the latter body of water and undoubtedly breeds throughout the whole region. Farther south it is less common about the western end of Lake Athabasca and Fort Chipewyan (Preble, 1908; Harper, MS.).

So far as I know the nesting of this Scoter has only recently been fixed for British Columbia; namely at Atlin in the north, where Allan Brooks found young in July, 1924. Numbers have been repeatedly seen on the Queen Charlotte Islands, on the coast and at Okanagan in the interior (A. Brooks, *in litt.*) as well as at other points throughout the summer (Fannin, 1891; Kermode, 1904; J. and J. M. Macoun, 1909), and at 158-Mile House A. Brooks (1903) found it common and possibly breeding. He picked up a dead female from whose breast the feathers (down) had been plucked exactly as does a nesting duck. In northern Alberta,



Spreadborough (in J. and J. M. Macoun, 1909) found the species common on Lake Ste. Anne and on all the larger lakes from Lesser Slave Lake to Peace River Landing. Raine (1892) says a female with a mature egg in the ovary has been shot at Swan Lake in northern Alberta. About Edmonton the species was found common in June (Soper, 1918), and in east-central Alberta, W. S. Brooks and Cobb (1911) found it fairly plentiful and (as they then thought) nesting. C. B. Horsbrugh (1915) states that he saw many hundreds on Buffalo Lake in June and that the species bred there; while along the Red Deer River, as well as at Burnt Lake, females have been shot with mature eggs in the ovaries (Taverner, 1919; Dippie, *fide* J. and J. M. Macoun, 1909).

In Saskatchewan A. Buchanan (1920) met with this species at various points along the Churchill River, the Reindeer River and Reindeer Lake in June and July. Coubeaux (*fide* J. and J. M. Macoun, 1909) states that it nests all about Prince Albert and Spreadborough (in J. and J. M. Macoun, 1909) found it common at Indian Head where a female containing a mature egg was shot. In southwestern Saskatchewan Bent (1907), however, found it only a very rare nesting bird.

Raine (1892) reports a nest found on an island at the south end of Lake Manitoba and says that the species breeds on the islands of Lake Winnipeg also. A nest has been taken on Shoal Lake, too (Taverner, 1919), and evidently at Dalton and Shell River as well (U.S. Biological Survey). **Manitoba**

Preble (1902) noted specimens in Keewatin at Knee Lake and York Factory in July, and states that many breed in the interior. Murray (1859) has recorded it from Trout Lake, Moose Factory and Severn House. It is doubtful whether it breeds along James Bay, but Spreadborough (in J. and J. M. Macoun, 1909) met with it in the months of June, July and August on the west shore of James Bay, as well as commonly from Moose Factory all the way to Richmond Gulf. **Keewatin**  
**Labrador**

Audubon says he found this Scoter nesting in southern Labrador and the Bay of Fundy, but no later observers have been able to reaffirm this statement. It is true that the species is common in summer all along the north coast of the Gulf of St. Lawrence and on some of the islands of the Gulf (see C. W. Townsend and Allen, 1907; C. W. Townsend and Bent, 1910; Comeau, 1909; etc.), but this is no proof of nesting. It is common on the east coast of Labrador, too, but even as far north as Port Burwell Hantzsch (1908) was unable to find any nests.

In the United States the species has been found breeding only in northern North Dakota, where it does so in considerable numbers on Devil's Lake, Stump Lake and Clearwater Lake (Job, 1899; Bent, 1901-02; F. M. Bailey, 1918a; R. M. Anderson, *in litt.*). **North Dakota**

#### WINTER RANGE

In Europe the Velvet Scoter has been once taken on the Faroes (H. C. Müller, 1869). It is rare on the Shetlands (A. H. Evans and Buckley, 1899), but regular in its appearance in the British Isles. It is, however, far less numerous than the Common Scoter. In Ireland it may be called rare, occurring chiefly in Dublin Bay and other localities on the east coast (Ussher and Warren, 1900). In Great Britain, too, it is uncommon on the west coast, though it is fairly plentiful on the east and south coasts (Seebohm, 1885; H. Saunders, 1899; Millais, 1913; Witherby *et al.*, 1919-22; etc.). **Faroes**  
**Shetlands**  
**British Isles**

In Norway it is found in small numbers on the coasts, as far north even as Tromsö (Collett, *fide* Dresser, 1871-81), but in Sweden it seems to occur only on the west coast in restricted numbers (Wallengren, 1854). It is moderately abundant in Denmark (Kjärbölling, 1850) and on the North Sea coast of Germany, being quite uncommon on the Baltic coast (Naumann, 1896-1905; Löns, 1906). It is not very abundant on the coasts of Holland (Schlegel, 1859) or of Belgium (Dubois, 1886; Raspail, 1913), and occurs only in very small numbers on the Channel coast of France (Ternier and Masse, 1907; Paris, 1907). No doubt a few **Norway**  
**Sweden**  
**Denmark**  
**Germany**



winter on the Biscayan coast of France, too, for it has been seen on the north coast of Spain (Irby, Spain 1883; Lilford, 1895; Aldaz y Amazabel, 1918) and has been taken at Figueira da Portugal Foz, Portugal (Oliveira, *fide* de Seabra, 1910).

Payton (London Field, Feb. 23, 1878) has reported it from Morocco, and Loche (1867) states that it is rare in Algeria, while Blanc (*fide* J. I. S. Whitaker, 1905) records it as occasional in Tunis. On the Mediterranean coast of Spain it is very uncommon, though it has occurred on the Albufera of Valencia and about Gerona (Pardo, 1924; Arévalo y Baca, 1887). In Provence, however, l'Hermitte (1916) considers it less rare than the Common Scoter, and the same seems to be true of Italy, where it has occurred in Liguria, Venice, Emilia, Tuscany, Romagna, and very rarely in Apulia and Calabria (Giglioli, 1886; Arrigoni degli Oddi, 1904). It has once been taken in Sardinia (Salvadori, 1865).

According to Kolombatović (1903) it is not so very rare on the Dalmatian coast in winter, but this statement must apply chiefly to the northern parts, for in Greece it is very rare (Lindermayer, 1860) if it occurs at all (Reiser, 1905). Erhard (1858) says it occurs on the Cyclades, and it is possible that the few Scoters that have been seen on Cyprus (Bucknill, 1910) and on the Palestine coast (Tristram, 1884) may have been Velvet, not Common Scoters. A. E. Brehm (1854) says he saw this species on Lake Menzaleh, Egypt, and von Heuglin (1873) states that it occurs sporadically in lower Egypt. No later observers seem to have noted any in Egypt, however, and Nicoll (1919) in his excellent checklist, does not mention it.

This species is apt to be seen inland during the winter, and it has been noted in many parts of Europe away from the coast. On rare occasions it has been seen in the interior of England (Witherby *et al.*, 1919-22) and in France (Paris, 1907; d'Aubusson, 1911). In Switzerland it is, in fact, quite common on the lakes both north and south of the Alps in winter (Fatio, 1904). Numerous specimens have also been taken on the Rhine and in almost every other State of the German Federation (Naumann, 1896-1905; etc.) as well as in Poland (Taczanowski, 1888; Prazák, 1898; Katin, 1912), Bohemia (Fritsch, 1872), Austria (von Tschusi zu Schmidhoffen and von Dalla-Torre, 1887, p. 341), in Hungary (*fide* Naumann, 1896-1905) and in Transylvania (Danford and Harvie-Brown, 1875).

Gengler (1920) reports having seen the species on the Sea of Marmora in February and to the eastward it is said to winter on the Black Sea (Zarudny, 1886) and in southern Russia (Valkh, 1911), and it certainly does so on Lake Goktschai in the southern Caucasus (Radde, 1884) and in larger numbers on the South Caspian (Radde, 1886; Zarudny, 1911), as well as about the Sea of Aral (Zarudny, 1886; Lansdell, 1885; Menzbier, 1888).

We know nothing of its winter status in central Asia, but I presume that some numbers winter on the larger lakes. On the Pacific coast it has been taken as far south as Foochow (Rickett, 1894; Kellogg, 1919), and in larger numbers on the lower Yangtse up as far as Nanking (von Heuglin, 1874; Styan, 1891; Wade, 1895). It has also been taken at Kiau-chow (Kleinschmidt, 1913) and in northeastern Chili (La Touche, 1921). In Japan it has been taken as far south as Hakata Bay, Nagasaki and Yokohama (Seebohm, 1890; Kuroda, *in litt.*), while on Yezo and the Kuriles it is common (Whitely, 1867; Blakiston and Pryer, 1878; Hatta and Murata, 1905-06), some wintering also on the Commander Islands (Bianchi, 1909; Hartert, 1920).

I find no record of its wintering on the western Aleutians, but it does so regularly on Unalaska (Dall, 1874), the Pribilofs (G. D. Hanna, 1920) and on Kadiak (Bretherton, 1896). Small numbers winter about Sitka (Willett, 1914), but on the coasts of Vancouver (Taverner, 1917) and British Columbia as well as in the interior on Okanagan Lake, it is regularly found (Fannin, 1891; Kermode, 1904; A. Brooks, *in litt.*).

It is very abundant on the shores of Puget Sound and at other points on the Washington coast (W. L. Dawson and Bowles, 1909; Rathbun, 1915) and on some of the bays of the Pacific Coast Oregon coast (Pope, 1895-96; Woodcock, 1902; Jewett, 1914), as well as along the en-









MAP 97. Distribution of White-  
 Breeding range, dotted  
 Sporadic record





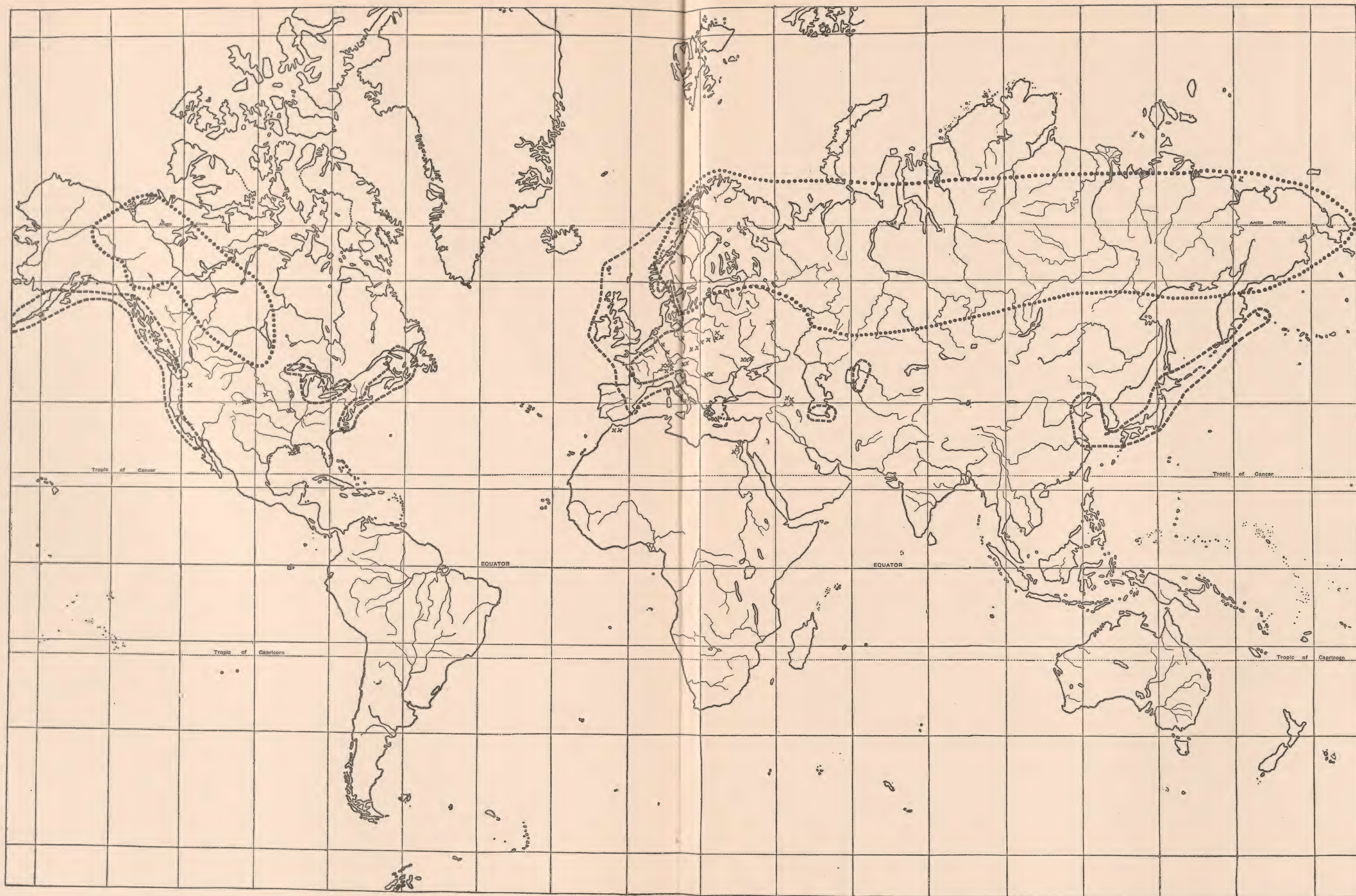
Lesser Velvet Scoter (*Oidemia fusca*)

Winter range, broken line  
by crosses (X)









MAP 97. Distribution of White-winged or Velvet Scoter (*Oidemia fusca*)

Breeding range, dotted line; winter range, broken line  
Sporadic records indicated by crosses (X)







tire coast of California (J. Grinnell, Bryant and Storer, 1918) and as far south as San Quentin Bay, Lower California (A. B. Howell, 1911). In the interior specimens have been taken rarely in Idaho (Rust, 1915), Colorado (W. L. Sclater, 1912; Bergtold, 1924), Nebraska (Bruner, Wolcott and Swenk, 1905), Iowa (Cooke, 1906), Missouri (Widmann, 1907) and occasionally on the coast of Louisiana (Kopman, 1921). Interior

Farther north the species is found regularly on the Great Lakes, occasionally in Minnesota (Hatch, 1892; Roberts, 1919) and much more commonly on Lake Michigan, in Wisconsin (Kumlien and Hollister, 1903), Illinois (Woodruff, 1907), Indiana (A. W. Butler, 1898), Michigan (Barrows, 1912) and more rarely in Ohio (L. Jones, 1903; W. L. Dawson, 1903), western Pennsylvania (Todd, 1904) and western New York (Eaton, 1901). Great Lakes

None seem to winter on the St. Lawrence, though they do so commonly on the shores of the Gulf, even on the north shore (Comeau, 1909), presumably about Newfoundland, occasionally on Prince Edward Island (MacSwain, 1908) and moderately commonly in Nova Scotia (Downs, 1888; Tufts, 1918). It is abundant along the entire coast of the New England States especially south of Cape Cod (G. M. Allen, 1909; *et al.*), Long Island (Eaton, 1910), New Jersey (W. Stone, 1909), Delaware (Rhoads and Pennock, 1905) and in diminishing numbers it appears on the coasts of Maryland (Kirkwood, 1895), Virginia (Rives, 1890) and North Carolina (T. G. Pearson, C. S. and H. H. Brimley, 1919). In South Carolina it is only a straggler; it has been taken on the Wando River, January 20, 1911 (Bragg, 1912) and on the Cooper River, January 31, 1918 (Simons, 1918). It has straggled as far south as Lake Worth, Florida, too (U.S. Biological Survey). On the Suwanee River, near Old Town, five were shot on October 20, 1917 (A. B. Cannon, U.S. Biological Survey). Atlantic Coast

Only two specimens of this species have so far been taken in Greenland. One was shot near Godthaab in May, 1878 (Reinhardt, 1879). A second was taken since then, so Mr. E. L. Schiöler writes me. Greenland

#### MIGRATION

As with all the Scoters, it is very difficult to distinguish in this species between migrating and resident birds and between breeders and non-breeders. In all parts of the range large numbers of non-breeding birds are known to spend the summer on the wintering grounds. This is true even in southern California, and on the Atlantic coast at least as far south as Long Island. In western Europe summer non-breeders are seen in England, and in eastern Europe in parts of Poland and central Russia.

They start very late for their breeding grounds; that is, a great many of them do. In Massachusetts waters May 12 to 15 is the usual date; some years even later than that. Those that pass directly inland are probably breeders and they may make a long flight without a stop. They rise high in the air about three or four o'clock in the afternoon and disappear inland at various points (Mackay, 1891; *et al.*). Before this many have been passing east along the North Atlantic coast perhaps to cross over at various points. We do not know just how far east the spring coastal flight proceeds. Most of those which pass on to eastern Labrador are very likely non-breeders who summer in northern regions.

On the Pacific coast their late migration is also characteristic, enormous numbers staying in Puget Sound well into May. They reach the MacKenzie delta early in June and old males were passing on June 17 (Stefánsson, 1913). The last of those which cut through southern British Columbia seem to leave the lake region there during the first few days in June. There, too, the flocks usually depart in late afternoon or just before dark, but Allan Brooks writes me that he has seen a flock tower up and clear away northeastward at nine o'clock in the morning.

Migration dates for Denmark and for western Europe show that Scoters move there very late in spring and that Velvet Scoters are later than Black Scoters.

In autumn the very early flights of Scoters in New England are principally of this species. Nearly every year there are considerable flights of "Gray White-wings" from August 11 to August 25. Some,



mostly males, come through in July and early August. A careful study of these early adults to determine just what they are would be well worth while. Mackay noticed that many of these early individuals (middle August) were females with their breast feathers (?) worn off. The real flights of females and young do not begin on the average before September 15 and they are at their height from the 8th to the middle of October. From that time on, that is, all through late October and November, old and young come along mixed up in more or less equal numbers, the flights tapering off rapidly after October.

Very early flights of old males are seen in Massachusetts in July and early August. The same phenomenon occurs on the Pacific coast. On July 4, 1920, at Dixon Entrance, Queen Charlotte Islands, Allan Brooks saw a considerable movement of old White-wings, ninety-eight per cent being males, with a few male Surf Scoters. Were these males that had left nesting females, or merely unmated outsiders?

It is interesting to find that in these ducks, and I think more or less with all ducks, when the migrating impulse is in full swing the stomachs are found to be empty. Nearly all those shot in early morning at Cohasset (Massachusetts) had certainly eaten nothing since the previous day. Possibly their plan is to halt and gather food through the middle and latter part of the day. I doubt if they ever feed regularly at night, except in their summer arctic homes.

In North America the great central breeding grounds supply both Atlantic and Pacific coasts. We do not yet know where the principal flight highways are, although Cooke (1913) has suggested them on a more or less hypothetical map. The autumn flights east include all the Great Lake region, James Bay and the Gulf of St. Lawrence. How far north on the east coast the breeding flocks strike the Atlantic is an open question, but probably not north of the Straits of Belle Isle. In spring the breeding birds probably strike directly inland from southern New England (possibly also from farther south and west on the coast) and take a short cut to southern Saskatchewan and the MacKenzie valley. Others, very likely non-breeders, pass east all the way to Labrador.

Now, on the Pacific coast where summering birds are common far west, even along the south shores of the Alaskan peninsula it seems at least likely, as Cooke (1913) has suggested, that this duck again takes a short cut, perhaps many short cuts from Puget Sound points eastward. Such breeding flocks are seen regularly in May in southern British Columbia and high mountains seem to be no obstruction to migrating ducks. Very likely they pass inland all along the coast up to Sitka and beyond, for we know that these Scoters are scarce on the west and north coasts of Alaska. At any rate few if any breeding White-winged or Surf Scoters pass around Alaska to get to their nesting grounds.

In regard to the sex and age distribution in winter there is general agreement, but much remains to be worked out. In the first place northern wintering flocks have a larger per cent of adult males than southern flocks. The south coasts of Great Britain and the Mediterranean coasts are supplied mostly by immature birds. Many authorities have noticed this. The situation is complicated of course by the fact that in all the sea ducks the sex distribution is different locally all over the winter range, certain bays being favored by males, rather more than by females or by young, for no obvious reason. Those Scoters that stop in fresh water, or winter there, are apt to be largely young of the year.

### GENERAL HABITS

KNOWN in the British Isles as the Velvet Scoter and with us usually as the White-wing, or White-winged Coot, this is the largest and showiest of the three species of Scoters. The various races which inhabit America, Europe and Siberia differ from each other chiefly in the form and color of the bills, and the shape of the loreal or frontal feathering about the base of the bill. The bill of all Scoters seems to be rather variable both in color and in form, and is the first part to show peculiarities in relation to geographical range.



The habits are similar in all the Scoters and they occupy much the same kind of coastal waters. They do not care about riding out the roughest gale although they can do so if they are forced to it. Ordinarily, as I see them, Scoters are partial to semi-protected sheets of water and often come farther up into bays than Eiders do. The chief habit difference in the White-wing is its migration time which is extremely early in the autumn, much before the Black Scoter and usually ahead of the Surf Scoter. In Massachusetts these ducks are moving south by August 12, sometimes in considerable numbers. In the spring the time of migration is long delayed, up to middle or late May (in Massachusetts), sometimes even June, and this Scoter seems to pass directly inland at certain points over New England. Like the others, old males are seen moving south in autumn in small numbers before the rest. In the White-wing there are evidences of this even in July. This is the Scoter that responds best to the sea-shooter's shrieking whistle, tumbling out of the air in a most extraordinary fashion as if shot from above.

WARINESS. Far more stupid even than the Black Scoter, the young birds are the "dumbest" of all true sea ducks. Shooters are generally agreed that White-wings come better to wooden decoys or bladder decoys than do the other kinds, and that in a big migration the bag is apt to show more White-wings than anything else. Old birds of course are a little warier, but far from wild. In the spring migration, when approaching shore for a cut overland, they get high in the air but can be brought down by a loud whistle, sometimes almost to the level of the water. Curiously oblivious of noises such as gun-shots, they seem besides to be unable to locate the source of sounds. It is ludicrous in shooting at a single one with a rifle at long ranges to see how hard it is for it to take seriously the splashing of a twenty-two caliber bullet close by. On migration scattered young birds often come to fresh-water lakes, probably mostly those birds which, tired out, have dropped from flocks. These lonely and usually very sleepy specimens look for company wherever they can find it, joining little parties of Ruddy Ducks, Scaups or any other diving ducks that happen to be about. They come easily up to live decoys or follow in a bunch of wooden decoys pulled to within gun-shot of the shore by means of an endless line passed through a pulley in the head of a sunken buoy out in the pond.

During wing-moult in August the males are said to be quite unapproachable by boat (Millais, 1913).

DAILY MOVEMENTS. See under Black Scoter. These sea ducks are principally day-feeders on their wintering grounds and seek deeper waters at night.

GAIT, SWIMMING AND DIVING. All Scoters are a good deal alike in their dread of land and are almost the last to trust themselves to *terra firma*. They feed at moder-



ate depths as a rule but Naumann thinks they can reach fourteen meters, which is barely possible, although not probable. The greatest depth observed by Dewar (1924) was only twenty-four feet. Their time under water is longer than with the Pochards and Scaups but probably seldom exceeds one minute. Anything over forty or fifty seconds is a long dive, even for the stoutest of the sea ducks and it is doubtful whether these ducks average much over half a minute. At depths of twenty-two feet, the dive period is about forty-five seconds. These Scoters often, but not always, open their wings part way just as they dive, but it has not been determined just how much the wings are used under water.

**FLIGHT.** Very slow and clumsy in getting under way, especially if the day be calm, these huge ducks are easily picked out while in flight, their coarse heads, thick necks, white wing-patches and low direct flight being unmistakable. On the winter feeding grounds they split up into small flocks and then often go about in lines, one behind the other. Over land they fly very high like all diving ducks and in spring huge flocks are common. Autumn migrating flocks are of almost any size from a half dozen to two or three hundred. They have a silent flight.

They can at will tumble out of the air from a great height, just as if they had been shot dead, the whole flock completely disorganized (?) by the mere noise of a piercing whistle (see under Black Scoter, Hunt) or a rifle ball. In the spring this tumbling as far as can be seen is engaged in merely in play, for a whole flock will rock violently down from an altitude of a thousand feet with a great rushing noise, so Allan Brooks tells me.

**ASSOCIATION WITH OTHER SPECIES.** As a rule Scoters when in flocks keep well away from other ducks, only mixing a little among themselves. The spring flight is made with the different species well sorted out. This species is even more unsociable than the other two and prefers to keep to itself.

The eggs are sometimes laid in the nests of other ducks. In North Dakota Bent (1901-02) found one in a Baldpate's (*Anas americana*) nest on two different occasions, and he also saw two in the nest of a Lesser Scaup.

**VOICE.** Allan Brooks refers to this bird in a letter to me as the most silent of all ducks. I cannot remember ever to have heard a sound from it myself. It is thus entirely different from the garrulous little Black Scoter.

The male is said to have a double note, a sort of whistled *whur-er*, as well as a peculiar rattling or cackling call (U.S. Biological Survey notes). Brooks says that he heard a young male, when alarmed close to shore, utter a curious low purring note like a gray squirrel's, as it swam away.

The female's call has been described by several observers as like *arr-arr* and is usually the only note heard (Harper, MS., etc.).



A call between a croak and a quack, given perhaps by both sexes, has been heard continually uttered from high-migrating flocks. It is quite possible that the calls, such as they are, may be more or less the same in males and females, for there is no *bulla ossea* at the bifurcation of the trachea of males, as in most ducks. Mackay remarked (1891) that as far as he knew, White-wings were always silent, but he had heard of their making a low quack. He adds that they can be called to decoys in the early spring by making a loud purring sound, like the call of a Brant.

The trachea itself is remarkable in being furnished in the male sex with two enlargements, one composed simply of expanded rings at about the junction of the middle and lower thirds and one immediately below the glottis. In this last a cross-section shows that the tracheal tube passes directly through the center of the bulb, but there is communication to the chamber of the bulb by an aperture on each side (Yarrell, 1884-85, plate).

**Food.** The food, so far as known, is similar in its nature to that of other Scoters, but this species is rather fond of shell-fish valuable to man. The winter food in Massachusetts coastal waters consists of mussels, quahogs, periwinkles, and hermit crabs, but a good many scallops are taken. A series of 219 stomachs taken in southern Massachusetts waters in December, January and February, showed a proportion of 44.43% of these edible shell-fish (MS., U.S. Biological Survey). In Washington State the northwestern oyster was the favorite food while "butter clams" were second. The Biological Survey have examined nearly 700 stomachs of this Scoter and through the kindness of Dr. E. W. Nelson I am able to quote from a brief résumé prepared by W. L. McAtee. It seems that besides shell-fish, crabs are an important item and various minor items include barnacles, bryozoans, sea-urchins, hydrozoans, starfishes, fishes and worms. A curious stomach obtained in Illinois in October was almost completely filled with may-fly nymphs (96%) with some fish remains.

The favorite food in Europe is the edible mussel (*Mytilus edulis*), *Cardium edule*, the crab, *Cancer pulex*, and mollusks of the genera *Mactra*, *Tellina* and *Solen* (Naumann, 1896-1905; Gadamer, 1855; Macgillivray, 1852). A great many of a strong shell called *Donax trunculus* are mentioned by several writers as having been found in the stomachs. These Scoters can take clams at least two inches in diameter. A stomach from California contained only univalve mollusks, such as *Olivella biplicata* and *intorta*, *Nassa perpinguis*, *Mangilia variegata*, and another contained "sand-dollars" (Echinoidea) (J. Grinnell, Bryant and Storer, 1918).

Vegetable food is taken, especially on fresh water, and McAtee (1911) found Scoters in Wisconsin living almost entirely on wild-celery buds for a time in autumn. Another had pond-weed root-stocks. Besides these items, stomachs in the large U.S. Biological Survey series contained seeds of coontail, besides water beetles and



their larvæ, while a number from Oregon in December contained eel-grass. The wide distribution of the White-winged Scoter all over the interior makes it probable that it feeds now and then on all the ordinary duck-weeds when mussels are scarce.

**COURTSHIP AND NESTING.** Flocks of adult Scoters bound for the breeding grounds from the great wintering area south of Cape Cod, Massachusetts, behave in a different way from the other Scoters, delaying their departure until exceedingly late in the spring: middle or end of May. They start late in the afternoon on a favorable day and passing through Vineyard Sound strike directly overland at various points, seeming to prefer a light following wind. These flocks are large, numbering from five hundred to six hundred birds while as many as ten thousand have been estimated passing in a single day (Mackay, 1891). On these spring overland journeys, which Allan Brooks (*in litt.*) has also witnessed at Okanagan, and other points in British Columbia, the Scoters have a way of rising from the water in small lots, slowly climbing in wide circles and then suddenly breaking violently downward after they have circled several times high in the air.

The display is in a general way like that of the other Scoters. On March 24 on Chesapeake Bay males in full show frequently lowered the head and neck until they rested on the water and then rushed along with rapid strokes of the feet to pause near the female, throw the head erect and then call (U.S. Biological Survey field-notes). Donald Gunn (1923) noticed on March 3 in Sussex, England, what he took to be a "ceremonial display." He describes it as consisting of the male's raising the bill toward the zenith and making "shuddering leaps forward towards another bird," which he assumed to be the female. Both birds then began diving, but not always in the same way. Some dives were quiet, some were leaping plunges, and one at least was a sort of "flight submersion with wings opened," the way in which Mallards sometimes dive.

It is rare indeed to see display attitudes in any of the Scoters, but in this species some sort of courtship has been noticed in autumn (November) and January (Rintoul and Baxter, 1917).

So far as observed the males of this and the Surf Scoter do not engage in the continuous chases after the females that occupy a great deal of the winter time of the Black Scoter. Mating flights on the breeding grounds have not been seen, but they possibly may occur. At Atlin, British Columbia, in June, 1924, these ducks seemed about to breed but there was absolutely no display, the male and female of a pair floating about listlessly (A. Brooks).

All Scoters invariably retire to fresh water for breeding.

The laying season is late, as in the other Scoters, in North Dakota the last of all the ducks. In Arctic Europe it covers the time from late June through early July. Even in a locality like North Dakota, it seems to be rare to find any eggs before the



middle of June, though at Fort Yukon, Dall and Bannister (1869) say they found downy young on June 23.

In North Dakota (Devil's Lake region) Job (1899) and Bent (1901-02) found these Scoters nesting in small colonies on islands in lakes or on the shores of lakes. The nests themselves were very well concealed, usually under rose bushes, though they were poorly constructed. They were well supplied with down. R. MacFarlane (1908) says that in Arctic America the nest is usually near the water amid clumps of small spruce or dwarf willows. In Scandinavia they nest on the lakes of the mountainous districts, sometimes as high as the birch-tree growth (Dann, in Yarrell, 1884-85; Gadamer, 1855).

The clutch varies in number from six to fourteen in North Dakota. In Europe large clutches have not been recorded; five to eight and occasionally nine to eleven seem to be the average (Witherby *et al.*, 1919-22). In color the eggs, when fresh, are pale salmon buff, which fades later to a cream color. They are larger than the eggs of any Arctic duck excepting the Eider's, and so cannot well be confounded with those of other species. They measure on the average 71.12 by 48.23 mm., the greatest length and breadth being 77 and 51.5, the smallest 64.3 and 44.8 mm. respectively (Hartert, 1920a). The down is larger than that of the Common Scoter and slightly more brown, with the pale centers less distinct (Seebohm, 1885). The incubation period is given by Heinroth (1922) as twenty-seven to twenty-eight days, but I should not be surprised if it were even longer than this.

Allan Brooks found the young ones in northern British Columbia diving freely for food as soon as they were led out into deep water, that is, about twenty-four hours after they were hatched.

The behavior of the male during the nesting season is similar to that of the male Black Scoter.

**STATUS.** Although there has been a good deal of talk of diminishing numbers of Scoters, the fact remains that we have little direct evidence of it, especially in this species. Shooting records on the New England coast give no evidence of a lessened flight in the past fifty years and lately there are even indications of a marked increase. We have really no way of comparing the present numbers with those of a hundred or two hundred years ago. The "good old days" of plenty always loom large in retrospect. The snow was deeper, the winters longer and the Scoters extended in unbroken windrows along every foot of shore-line. Possibly; but we know that they are with us in almost unbelievable numbers to-day. I have mentioned the flights at Cohasset under the Black Scoter's status and have shown that thirty, forty, or fifty thousand passing close by the shore in one day is not unusual. A million or more must go by in the season. Mackay tells of a flock of twenty-five thousand between Muskeget and Nantucket in March, 1875, while Boulton and



Griscom (1923) reported a flock one and a half miles long by four hundred yards wide off Montauk Point at Christmas time, estimated (and he admits ridiculously low) at fifty thousand or more. They are just as common on the Pacific coast, present in simply enormous numbers in Puget Sound in May. The numbers of Scoters reported by Audubon in Gulf of St. Lawrence waters in spring were enormous, but their numbers there are still beyond belief.

We know that a great many moulting Scoters and Eiders and probably also Labrador Ducks used to be killed in those waters for the feather trade, but that was long ago. Without a doubt they were always subject to slaughter by natives, both Indians and Eskimos, all along the coast from Maine to eastern Labrador, but these birds were mostly non-breeders (the Scoters at least). If the sea ducks existed to-day in the vast numbers that we are lead to believe they once used to, our shell-fish industry would suffer to such an extent that all protection would have to be removed.

As to the relative numbers of this species on the Atlantic coast, it seems to rank a little less than the Surf Scoter, but not much, say from 35 to 45% of the combined numbers of all three, the Black Scoter about 5 to 7% and the Surf Scoter fully 50 to 55%. The relative numbers on the Pacific coast are about the same, although this species may rank even higher there.

There is one point in regard to distribution of all the Scoters on migration which makes it *appear* that they are much scarcer here than formerly. This is their avoidance of ponds in New England in recent years. Just why this is so I do not know, but it is a fact that all over eastern Massachusetts the Scoters once bedded in our ponds in such large numbers in October that good shooting was obtained. Now it is uncommon to see any except straggling birds and very small lots, mostly young of the year. Besides, there is little doubt that they "cut corners" more than they used to and keep more out to sea, so that they are not seen so often. It is most remarkable that such stupid fowl are able to learn by experience, but there is no other explanation for these changed habits.

Off the California coast this is not so common as the Surf Scoter but farther north it seems to exceed it.

There is no reason why any of the Scoters should have decreased on the Pacific coast.

All over the shores of western Europe and the North Sea coasts this is greatly exceeded by the Black Scoter.

ENEMIES. In Sweden the following animals destructive to Scoters are recorded by Gadamer (1855): he found a young Velvet Scoter in the stomach of a pike; the Goshawk (*Astur palumbarius*) and especially the eagle (*Haliaëtus albicillus*) are a great menace. The former attacks them on the nests and when flying overland.



Ravens and crows as well as men plunder the nests, while the weasels (*Mustela erminea*) do away with both the sitting females and the eggs.

Bowles (1909) found several of them dying of a "tape worm" three inches long.

**DAMAGE.** Like other Scoters this species has been accused of doing some damage to the shell-fish industry on the North Atlantic coast. Out of a series of 219 shot off the coast of Massachusetts in December, January and February, it was found that scallops comprised a little over 44% of the whole diet (U.S. Biological Survey MS.). As this is an abundant duck all winter, especially in the region where scallop beds abound, it may be a factor of some importance. The fishermen themselves are anxious to be able to shoot the ducks all winter, but an open season on one species is never practical. Hence some means must be devised of patrolling the beds in the day-time.

**FOOD VALUE.** As food this Scoter is no better than the others. Audubon made the extraordinary statement that in his day they sold in our eastern markets for 50 cents to \$1.00 the pair. Such a high price was unheard of in Boston Market at a time when game was bringing several times the price it did in the day of the great naturalist. I have often seen them selling for 15 cents to 20 cents apiece, and they were hard to dispose of even then. This all goes to show that the craving for strong-tasting meat, Scoters, Eiders, Mergansers and Loons was much greater a hundred years ago than it is now. The lessened demand goes hand in hand with the evolution (or degeneration) of the race. We are less rugged and more highly organized nervously, than our forebears, and our steam-heated constitutions cannot tolerate the hearty food and strong drink that seemed to agree with them.

**HUNT.** Although in many places Scoters are hardly disturbed at all, on the New England coast, where the better ducks were never common, they were and still are shot regularly on autumn migration as already described under the Common Scoter.

**BEHAVIOR IN CAPTIVITY.** Like the other Scoters, this species is very rarely seen in confinement. Heinroth (1913) reared one from a clutch of wild-laid eggs sent to him from Sweden in 1912, but the duckling was soon killed by a rat. Job (1915) during his expeditions to southern Saskatchewan, collected eggs and succeeded in rearing young. He tells me that they were rather sedate and heavy, tame and gentle, though interesting. They ate well but evidently the usual duckling food did not fully nourish them. They were undersized, did not feather well and all died off before getting fledged. He was sure that if he had been able to secure shell-fish for them they would have thrived.



HYBRIDS. The only hybrid recorded, as far as I know, is a wild cross between this and the Common Golden-eye (Leverkühn, 1890).

## GEOGRAPHICAL RACES

## VELVET SCOTER

## OIDEMIA FUSCA FUSCA (LINNÉ)

*Anas fusca* Linné, Systema Naturæ, ed. 10, vol. 1, p. 123, 1758.

*Oidemia fusca* Fleming, Philosophy of Zoology, vol. 2, p. 260, 1822.

CHARACTERS: Adult male, bill broad at the tip with a very moderate elevation or knob at the base of the culmen. Feather edge nearly straight across top of culmen, and loreal feathers more than 5 mm. from posterior edge of nostril. Frontal feathering not projecting as far forward as loreal feathering. The area around nostrils, a line down lateral base and along margin of culmen, black as well as a line on each side from the nostrils to the nail. Remainder of culmen rich orange to reddish flesh-color, the richer color on the sides.

Females distinguished by a slightly longer bill and by a feather edge similar in outline to that of the males. Not all specimens can be distinguished from females and young of other races.

RANGE: Western Europe as far east as the Jenesei and south to Mediterranean waters and the Caspian Sea.

## ASIATIC VELVET SCOTER

## OIDEMIA FUSCA STEJNEGERI RIDGWAY

*Anas carbo* Pallas (in part), Zoographia Rosso-Asiatica, vol. 2, p. 244, 1811.

*Oidemia stejnegeri* Ridgway, Manual No. Amer. Birds, p. 112, 1887.

*Fuligula fusca stejnegeri* Seebohm, Birds Japan. Empire, pp. 250, 252, 1890.

*Oedemia carbo* Salvadori, Cat. Birds British Mus., vol. 27, p. 411, 1895.

*Oidemia fusca stejnegeri* Hartert, Vögel d. Paläark. Fauna, p. 1356, 1920.

CHARACTERS: Adult male similar to the Velvet Scoter of Europe but the knob at the base of the culmen more elevated into a distinct hump, while the nasal openings are almost round. The loreal feathering extends nearly to the nostril and just under it. Pattern of orange color also different, this color not as a rule extending so far back along the edge of the culmen as in the European race. Wing 274–286 mm.

Females and young with shorter bills and loreal feathering extending nearly to the nostrils. The nostrils themselves are rounder in cross-section than in the European race. Females of this race cannot be separated from the females of *Oidemia fusca deglandi*.

RANGE: Eastern Siberia from the Commander Islands and Kamchatka westward to the Altai and Minusinsk district. In winter south to the Japanese and Chinese coasts.

## AMERICAN VELVET OR WHITE-WINGED SCOTER

## OIDEMIA FUSCA DEGLANDI BONAPARTE

*Anas fusca* Wilson (*nec* Linné), Amer. Ornith., vol. 8, p. 137, pl. 72, 1814.

*Fuligula fusca* Bonaparte (in part), Ann. Lyceum Nat. Hist. New York, vol. 2, p. 390, 1826.

*Oidemia fusca* Swainson and Richardson (*nec* Linné), Fauna Boreali-Amer., vol. 2, p. 449, 1831.

*Melanitta fusca* Eyton (in part), Monograph Anatidæ, p. 147, 1838.

*Oidemia deglandi* Bonaparte, Revue Critique, p. 108, 1850.





*Alan Brooks.*

HEADS OF SCOTERS

EUROPEAN BLACK SCOTER  
VELVET SCOTER  
ASIATIC VELVET SCOTER

AMERICAN BLACK SCOTER  
AMERICAN VELVET SCOTER  
SURF SCOTER







- Oidemia velvetina* Cassin, Proc. Acad. Nat. Sci. Philadelphia, vol. 5, p. 126, 1850.  
*Fuligula bimaculata* Herbert, Field Sports, ed. 2, vol. 2, p. 336, fig., 1855.  
*Melanetta deglandi* Bonaparte, Comptes Rend. Acad. Sci. Paris, vol. 43, p. 651, 1856.  
*Melanetta velvetina* Baird, Birds No. Amer., p. 805, 1858.  
*Oidemia (Pelionetta) bimaculata* Baird, Birds No. Amer., p. 808, 1858.  
*Melanitta deglandii* G. R. Gray (in part), Hand-list, vol. 3, p. 89, 1871.  
*Oedemia fusca*, b. *velvetina* Coues, Birds of North-west, p. 582, 1874.  
*Oedemia velvetina* Sclater, Proc. Zool. Soc. London, p. 529, 1880.  
*Fuligula (Oedemia) velvetina* Reichenow, Ornith. Centralbl., p. 17, 1882.  
*Fuligula fusca velvetina* Seebohm, History British Birds, vol. 3, p. 605, 1885.  
*Oedemia deglandi* Salvadori, Cat. Birds British Mus., vol. 27, p. 409, 1895.  
*Oidemia fusca deglandi* Hartert, Vögel d. Paläark. Fauna, p. 1357, 1920.

CHARACTERS: Adult males lacking the high culmen-knob of *Oidemia fusca stejnegeri* but with a protuberance somewhat greater than in *Oidemia fusca fusca*. Loreal feathering extending forward nearly to the nostril as in *Oidemia fusca stejnegeri*, and frontal feathering extending forward to form more or less of a point. Lower parts, especially sides, flanks and abdomen, dull brown instead of entirely black as they are in *Oidemia fusca fusca* and in *Oidemia fusca stejnegeri*.

The females and young, according to Hartert, may be distinguished from those of *Oidemia fusca stejnegeri* through their lighter-colored abdomens and flanks. From the females of the European species they can be separated only with difficulty through the different feather margins along the base of the bill. In the American White-winged Scoter there is a tendency to form angles on the lores, and the frontal feathering extends as far forward as the loreal feathering. In the Velvet Scoter of Europe the frontal feathering does not extend as far forward as the loreal feathering and forms a blunter protuberance. There is little if any difference in general coloration between the females of the two races.

RANGE: Breeding from North Dakota to MacKenzie delta and upper Yukon River; in winter, the Atlantic coast, Great Lakes and probably (see *Oidemia fusca dixonii*) to Pacific coast.

#### PACIFIC VELVET OR WHITE-WINGED SCOTER

##### *OIDEMIA FUSCA DIXONI* BROOKS

*Oidemia fusca dixonii* Brooks, Bull. Mus. Comp. Zool., vol. 59, p. 393, 1915.

CHARACTERS: This race although questioned by Hartert is probably deserving of recognition. W. S. Brooks found that male specimens which he obtained from the northern Pacific coast had shorter, blunter and broader bills than those from the Atlantic coast. There seems to be no doubt from the material in which I have made comparisons that *some* of these western birds are distinguished by the character referred to. I do not think that *all* of them can be separated on this character alone for there are occasional Atlantic coast males with very short bills (37 mm.) which are not to be distinguished either by the size or shape of bill from *some* Pacific coast birds. The females of the proposed *Oidemia fusca dixonii* are even more difficult to separate than are the males.

Dr. A. Wetmore writes me that he noticed a slight anatomical difference in the skulls of Atlantic and Pacific coast specimens, this difference being in the direction (angle) of the postorbital process. Allan Brooks is undecided as to the validity of the race and has sent me a number of sketches of Pacific specimens. The bills of some of his specimens were obviously distorted through the wrong method of tying, but he thinks that the older the bird the larger the "lump" at the base of the culmen and the wider or more spatulate the bill.



Dr. R. M. Anderson writes me that after examining a great many specimens of eastern and western birds he felt that he could not agree with Brooks in recognizing the western form as separate.

To sum up, it seems possible that individuals of *both* the eastern (*deglandi*) and western (*dixonii*) forms of the White-wing winter on the Pacific coast, a suggestion which would account for the existing confusion.

**RANGE:** It may well be asked, From what part of the interior of North America do the White-winged Scoters that reach the Pacific coast come? This we do not yet know, although banding operations on the southern and northwestern parts of the breeding range might throw light on this point.



## SURF SCOTER

*OIDEMIA PERSPICILLATA* (LINNÉ)

(Plates 73, 75, 76, 77)

### SYNONYMY

*Anas perspicillata* Linné, Systema Naturæ, ed. 10, vol. 1, p. 125, 1758.

*Anas latirostris* Boddaert, Tabl. des Planches Enluminées, p. 58, 1783.

*Melanitta perspicillata* Boie, Oken's Isis, p. 564, 1822.

*Platypus perspicillatus* Brehm, Lehrbuch Naturg. Europ. Vögel, vol. 2, p. 823, 1824.

*Oidemia perspicillata* Stephens, General Zoology, vol. 12, pt. 2, p. 219, 1824.

*Fuligula* (*Oidemia*) *perspicillata* Bonaparte, Ann. Lyceum Nat. Hist. New York, vol. 2, p. 389, 1826.

*Pelionetta perspicillata* Kaup, Natürl. System, p. 107, 1829.

*Oedemia perspicillata* Bonaparte, Cat. Met. Uccelli Europ., p. 72, 1842.

*Pelionetta trowbridgii* Baird, Birds No. Amer., p. 806, 1858.

*Oedemia perspicillata*, var. *trowbridgei* Coues, Key Birds No. Amer., ed. 1, p. 295, 1872.

*Oedemia perspicillata*, b. *trowbridgii* Coues, Check-list, ed. 2, p. 117, 1882.

### VERNACULAR NAMES

*English:* Surf Scoter, Surf Duck, Surf Coot, Horse-head Coot, Skunk-bill, Skunk-head (Coot), Skunk-top, Google-nose, Patch-head, Patch-polled Coot, White-scop, Muscle-bill, Pictured-bill, Plaster-bill, Snuff-taker, Speckled-bill, Spectacle Coot, Morocco-jaw, White-head, Bay Coot, Blossom-bill, Black Sea Duck, Butterboat-bill, Lake Huron Scoter, Box Coot, Hollow-billed Coot, Pishaug, Gray Coot, Brown Coot, Little Black Duck, Deaf Duck, Bottle-nosed Diver, Booby (Duck), Sea Coot, Squaw Duck, Bald Coot.

*German:* Brillen-Ente, Brillentauchente, Brillentrauerente, Schwarze Ente.

*French:* Macreuse à lunettes, Canard marchand, Macreuse à large bec, Morillon à lunettes, Fuligule à lunettes, Canard du nord.

*Italian:* Anitra di becco largo.

*Danish:* Brilleand.

*Norwegian:* Brilleand, Baffinsand.

*Swedish:* Hvitnackad Svärta, Glasögonand.

*Finnish:* Valkoniske merilintu.

*Russian:* Svestun.

*Eskimo:* (Alaska) Tu-tal-ik; (Labrador) Sorluktok, Orksulio-jartok, Kejuktun-giak.



## DESCRIPTION

**ADULT MALE:** General color deep rich black with bluish or greenish reflections. There are two large white patches on the head: the front one, squarish in shape on the crown forward of a line drawn between the eyes; the hind patch situated on the nape and triangular in shape with the apex pointing backward. Wing black and without any speculum-patch. Under side of primaries gray-brown. Bill very peculiar in shape, the sides bare of feathering and the frontal feathering projecting forward nearly to nostril. The upper mandible has a large black square patch on each side near the base separated from the loreal feathering by a line of crimson and from the feathering above it by orange color. In front of the black patch is a large area reaching to the nostrils which is nearly white. Top of culmen red-orange or carmine shading into lighter tones (yellows) toward the nail and toward the cutting edge. Nail yellow, lower mandible mostly yellow or flesh-color.

Iris white or nearly white. Legs and feet orange-red, more brilliant and crimson externally; joints more or less marked with dusky, and webs black.

Wing 240-256 mm.; bill 34-41; tarsus 43-47.

Weight 2 pounds, 8 ounces to 3 pounds, 4 ounces (1.13 to 1.47 kilograms).

**ADULT FEMALE:** Dull uniform brown above, darker on the primaries and secondaries. Lower parts, especially breast, sides and lower abdomen, dull brown of the same color, but center of abdomen often lighter colored, occasionally whitish. Top of head and forehead black, with usually a whitish nape-patch less prominent than in the male, but in the same situation. There are also whitish spots between the eye and the bill and back of the eye on the auricular region. Sometimes these patches are much obscured. Chin dirty grayish brown and the remainder of head and neck brown like the mantle and scapulars.

Iris reddish brown to brown-gray and perhaps in some cases gray, almost like that of the male. Bill, in shape nearly as in the male, but not so high at the base, and the nostrils narrow. Color greenish black with the blacker patch on the sides more or less indicated. Legs and feet yellow-orange with the webs dusky.

Wing 225-235 mm.; bill 34-40; tarsus 41-45.

Weight 2 pounds to 2 pounds, 7 ounces (0.90 to 1.13 kilograms).

**MALE AND FEMALE IN FIRST (JUVENAL) PLUMAGE:** In this plumage of the first autumn the sexes cannot be told apart, although the male is a little larger on the average. These young birds resemble the adult female but can be immediately picked out by their much lighter under parts, which are very light brown to silvery white. The plumage above is not quite so dark or glossy as in the adult female and the occipital patch is browner. The loreal and auricular light-colored face-patches are more prominent in this plumage, and the tail-feathers are blunted at the tips.

Iris brown. Weight 1 pound, 13 ounces to 2 pounds, 4 ounces (0.82 to 1.02 kilograms).

*Note:* In this plumage the Surf Scoter looks a good deal like the Black Scoter but its huge bill and whitish face-patches distinguish it.

**IMMATURE MALE:** Although the first plumage, described above, may be carried for a long period, perhaps almost intact until late winter or early spring (April), there are many specimens which begin to show adult characters by November. Black feathers usually appear first on the head and neck and the white loreal and auricular face-patches may be obscured by these as early as December. Black feathers later appear on the breast, flanks and scapulars and some individuals will be found as early as mid-January that are black all over the head and neck, with a fully developed white nape-patch on the back of the head. The breast, sides, many scapulars and even some rump- and upper tail-





SURF SCOTER

Immature Male

Immature Female

Adult Male

Adult Female







feathers may be black by this time, but the white crown-patch is never grown the first winter. In forward birds the changes in the shape and coloring of the bill are marked during this period and proceed hand in hand with the advance in plumage. The tail is often partly or entirely renewed before spring, but most, if not all, of the old feathers are retained on the mantle, wings and over the whole abdomen. The abdomen color fades out greatly by April or May and becomes almost white in many cases. Although various color changes take place in the bill and feet the first winter, adult coloration is never reached until much later. At first the bill takes on an orange color around the nostrils and this color extends as the season advances.

During the first summer the plumage is full of old worn juvenal feathers and this merges into the second winter plumage. In this plumage, that is, at sixteen months or more, I think that most individuals are in full dress, but there are some backward specimens which have brownish under parts, the frontal patch absent or poorly developed, and bills without the full coloring. All these signs of immaturity may be present in the same individual. It is safe to say that *all* males are in full winter dress when twenty-eight months old and have the highly colored bill and the white eye.

IMMATURE FEMALE: There is not much change in general appearance during the first winter.

ADULT MALE IN SUMMER: The few specimens examined show that there is no assumption of a female type of plumage, although the chin and throat may become whitish brown and such areas may also appear on the fore part of the face. The body coloring remains black but it loses most of its luster, becoming almost brown-black below.

ADULT FEMALE IN SUMMER: Summer specimens always show the edges of the feathers of mantle and scapulars light-colored and abraded, giving the bird a barred appearance which is very characteristic of all the Scoters. The under parts are more apt to be dark brown, not silvery. Culmen dark slaty, the lower mandible dark plumbeous, its tip brownish yellow; gular sac brownish flesh-color.

Iris brownish gray. Tarsus and toes dull brownish ochraceous with an orange tint; outer side of tarsus and outer toe dull reddish (Harper, MS.).

YOUNG IN DOWN (Plate 77): This plumage does not seem to have been described. The first specimens, so far as I am aware, were obtained by Francis Harper on the north shore of Lake Athabasca, July 28, 1920, from the only brood of young which he found in that region. As mentioned under the Black Scoter (*Oidemia nigra nigra*), the young of the Surf Scoter are very similar in coloring. These last can be distinguished with certainty only by the forward prolongation of the frontal feathering on the bill, which is very marked, and also by the absence of a white dot just below the eye. This white dot, however, is not *always* present in the young of the Black Scoter. The body coloring of the young Surf Scoter is dark gray-brown above, without any spots on wing rudiments, scapular areas or sides of rump. The coloring of the upper side merges gradually into the pale silvery gray of the abdomen. The top of the head, down to and just below the eye, is very dark brown, almost black, rather sharply separated from the paler cheeks, throat and chin. The under side of the neck and the upper breast are gray-brown like the mantle. The bills of these downy young were dark glossy slate, with nail and the unguis brownish, paler at the tip; the gular sac brownish flesh-color.

The iris was deep olive brown. The tarsus and toes were very pale, dull brownish, outer side of tarsus and outer toes slaty brown; webs and outer side of lobe of hind toe fuscous.

## DISTRIBUTION

THE Surf Scoter is an American species which not infrequently strays to Europe. As with the other Scoters we must admit our ignorance in regard to many points connected with the breeding distribution. The nesting grounds are the rocky ponds and lakes east of the MacKenzie River in the wildest and least-known regions of the Barren Grounds.



## BREEDING RANGE

It is possible that the breeding range of this Scoter extends as far to the west as northeastern Siberia, but at present there is no satisfactory evidence of breeding outside North America. Nelson (1883) states that he found it about Cape Wankarem on August 1, and specimens have been taken on the Commander Islands in June (Bianchi, 1909; Hartert, 1920). Buturlin (1908) includes the species in his list of birds of the Chukchi region, evidently on the strength of Nelson's observations. I must confess that I cannot find anything in Palmén (1887) to justify the statement that the Vega Expedition found it nesting on the Chukchi peninsula. Palmén says the Vega Expedition did not see the species, and merely quotes Nelson.

It is scarcely probable that it nests on the Aleutians, though L. M. Turner (1885) says a few do so on the Near Islands and other observers (Seale, 1898; A. H. Clark, 1910) have seen some, probably non-breeding birds, in June. All along the southern and southeastern coast of Alaska the species is common in summer (Gianini, 1917; Bishop, 1900; Loring, 1902; Bailey, MS.), but no nests have been taken, excepting, it is said, at Sitka by Bischoff (*fide* Dall and Bannister, 1869) and by Bean (*fide* Nelson, 1887), both unsatisfactory records. Both L. M. Turner (1886) and Nelson (1887) state that it is common on the Yukon and the latter says it nests there, even above the Fort. Lord William Percy tells me that he saw only non-breeding birds about Port Clarence, and Nelson (1887) admits that the tremendous numbers of Surf Scoters he saw in summer off the mouth of the Yukon were males. If the species nests anywhere in Alaska it is about Fort Yukon. The catalogue of the egg collection of the United States National Museum records eggs taken there in 1866, and the register of specimens of the same Museum contains a note by Kennicott that he found the species breeding abundantly at the Fort in June, 1861. Dall (*fide* Nelson, 1887) is said to have taken young in down below the Fort.

In northwestern Canada the Surf Scoter is not uncommon on the Arctic coast. R. M. Anderson (1915) has recorded it from Collinson Point and Stefánsson (1913) considered it rather common on the MacKenzie delta while Raine (1892), indeed, claims to have eggs sent him by missionaries about the delta!

The center of abundance in the breeding season, so far as we know, is the region along the Anderson River from Great Bear Lake to the Arctic coast. R. MacFarlane (1908) speaks of it as an abundant breeder in this region, and this statement is more than sufficiently substantiated by the clutches of eggs in the U.S. National Museum sent from Franklin Bay, Fort Anderson and Rendezvous Lake. From farther south the same Museum has eggs collected at Fort Rae and at Fort Resolution. In 1920, Mr. Francis Harper, collecting for me in conjunction with the U.S. Biological Survey, discovered the species breeding northeast of Moose Island at the eastern end of Lake Athabasca. This, so far as I know, is the southernmost breeding district in western Canada, although it may doubtless be found farther southeast toward Reindeer Lake.

Undoubtedly this Scoter nests much more commonly about the great lake system of northern Canada than the few available records of nests or young would indicate. At any rate it is abundant all through the region in summer. Ross (1862), Preble (1908), Seton (1911), A. Buchanan (1920), Harper (MS.), all found it common along the MacKenzie from the delta up, about the south coasts of Great Bear Lake and thence to Fort Rae, all about Great Slave Lake, Great Slave River, Lake Athabasca, even to the eastern end, north of Fort du Brochet, the Reindeer River and the Churchill River.

On the west coast of Hudson Bay, Rae (British Museum specimen) found the species as far north as Repulse Bay. South of Cape Eskimo, Preble (1902) found it fairly common in August. He met with it near Fort Churchill also, and near Pine Lake about mid-September. Spreadborough (*fide* J. and J. M. Macoun, 1909) found it abundant all along the west coast of James Bay in July and August and on the east coast of Hudson Bay from Cape Jones to



Richmond Gulf in June. Todd (T. G. Pearson, 1915) met females with broods on Charlton Island and on one of the Sheppard Islands at the southern end of James Bay. In a letter to me he writes that he also found the species nesting on Lake Petitsikapan and some of the other lakes of central Labrador. Audubon says he found a nest and shot the brooding female near Little Mecattina on the north shore of the Gulf of St. Lawrence. Both Coues and Packard (*vide* C. W. Townsend and Allen, 1907) state that a few nest along the east coast of Labrador, where this Scoter is abundant during the summer, north even to Hudson Strait, but they did not bring forward convincing evidence. The fact that many old males are seen along the east coast of Labrador in summer has led to a surmise that they may have just left breeding females in the immediate interior.

This species has been several times taken in Greenland, but, as far as I know, does not breed there. The records given by H. Winge (1899) are the following. For the west coast: Julianehaab, 1878; Godthaab Fjord, 1836; one without locality, 1856; Iginiarfik (68° north latitude), 1878; Disco Bay, June, 1879; for the east coast only one, July, 1830, near Kangerajuk. The statements of the Eskimos that they had also seen young in down at Disco, have no value. Greenland

#### WINTER RANGE

In winter the Surf Scoter is found as far north as Alaska. A specimen was taken on Bering Island as late as November 6 (Hartert, 1920), while throughout the Aleutians it is abundant in winter (L. M. Turner, 1886; Nelson, 1887). Small numbers are found in southeastern Alaska also (Bailey, MS.), while on the coast of Vancouver and British Columbia it is found in great numbers (Fannin, 1891; Kermode, 1904; Taverner, 1916). The same is true of the whole Pacific coast of the United States from Washington (W. L. Dawson and Bowles, 1909; Rathbun, 1915) and Oregon (Woodcock, 1902; Jewett, 1914) south through California (Grinnell, Bryant and Storer, 1918) to the coast of Lower California (Kaeding, 1905; Willett, 1913), south to San Quentin Bay (Nelson, U.S. Biological Survey) and a few on Angel de la Guarda Island, Gulf of California (C. H. Townsend, 1923).

In the interior it is occasionally seen in autumn in Idaho (Rust, 1915) and Montana (A. A. Saunders, 1921), while it has occurred once in Wyoming, at Douglas, October 19, 1898 (Grave and Walker, 1913), and three times in October, 1887, and October, 1899, in Colorado — Interior at Denver, Barr Lake and Loveland (W. L. Sclater, 1912). There are several winter records for Nebraska (Bruner, Wolcott and Swenk, 1905) and a few for Kansas (Bunker, 1913; H. Harris, 1919), Missouri (Widmann, 1907) and Iowa (R. M. Anderson, 1907). In the Mississippi Valley it occurs very rarely as far south as Louisiana — near New Orleans, March 20, 1890 (Beyer, Allison and Kopman, 1907).

About the Great Lakes it is found along with the other Scoters, occasionally in Minnesota (Roberts, 1919), more commonly in Wisconsin (Kumlien and Hollister, 1903), Illinois (Woodruff, 1907; Cory, 1909) and Michigan (Barrows, 1912), but evidently not on Lakes Erie and Great Lakes Ontario.

On the Atlantic coast this duck is found occasionally in winter as far north as New Brunswick (Chamberlain, 1882) and Prince Edward Island (U.S. Biological Survey). It is com- Atlantic Coast mon in Nova Scotia (Downs, 1888; Millais, 1913; Harry Piers, *in litt.*) and abundant all along the coasts of New England (G. M. Allen, 1909; *et mult. al.*), Long Island (Braislin, 1907; Eaton, 1910), New Jersey (W. Stone, 1909), Delaware (Rhoads and Pennock, 1905), Maryland (Kirkwood, 1895) and Virginia (Rives, 1890). Farther south, in North Carolina (T. G. Pearson, C. S. and H. H. Brimley, 1919) and South Carolina (Wayne, 1910) it is not very common excepting on Pamlico, Core and Albemarle Sounds, and in Florida it has only been seen a few times, once at Punta Rassa (F. M. Chapman, 1888a) and at Lake Worth where Cory (1895) says he saw no less than fourteen flocks after a "freeze." Mr. W. Y. Peters writes me that a few are occasionally seen in mid-winter outside Cape Canaveral.

The evidence of its occurrence in Jamaica requires confirmation (Bangs and Kennard, 1920), but it is known to have occurred three times in the Bermudas (J. M. Jones, 1859; Stragglers Merriam, 1884).



## EUROPEAN OCCURRENCES

THIS Scoter not infrequently straggles to Europe. Curiously enough it has never been seen in Iceland, though it has been once taken on the Faroes (H. C. Müller, 1869; Feilden, 1872) and once seen on the Shetlands (Dunn, 1848). On the Orkneys six specimens have been taken and others have not infrequently been seen there. Three have been taken at other localities in Scotland (Millais, 1913) and six or eight in Ireland — counties Down, Dublin, Cork, Mayo and Sligo (Ussher and Warren, 1900; R. Warren, 1897). There are about eleven records of specimens taken in England, representing counties Cumberland, Lancashire, Cornwall, Devon, Dorset and Scilly Isles (Harting, 1901; Witherby *et al.*, 1919-22).

On the Continent the Surf Scoter was taken near Bergen, Norway, September 23, 1893 (Schaaning, 1913); at Karesuando, 1833, and Calmar, June 14, 1846, Sweden (Nilsson, 1858); near Kittilä, 1858, in Enare-Lapland, twice in Åland, 1866, and once at Pojo, Finland, May, 1867 (Palmén, 1876); once on Helgoland, October 9, 1851 (Gätke, 1895); once in Holland (van Oort, 1914), twice in Belgium, 1845, and between 1895-98 (Dubois, 1898; Ternier and Masse, 1907) and several times on the Channel coast of France, as follows: one, 1835, near Calais and another in 1835 at Caen; Paris Market, 1845, 1846, 1852, 1864; six specimens in the Marmottan Collection from the mouth of the Somme (Degland, 1849; Naumann, 1896-1905). In Switzerland the species has been taken twice: once on Lake Constance and once, April 1, 1818, on Lake Geneva (Fatio, 1904).

## MIGRATION

THERE are some points about the migration of this species that distinguish it from our other American Scoters. Large flocks of non-breeding birds spend the summer far south on the wintering grounds, off the California and Washington coasts and abundantly in the interior of British Columbia (A. Brooks, 1903, 1917, 1920) as well as along the Alaskan coasts north as far as Kotzebue Sound (Nelson, 1887). On the Atlantic coasts such non-breeding birds are not infrequently seen in summer off the coasts of Long Island and New England, and in the Gulf of St. Lawrence they are abundant. The same is true of the Labrador coasts.

In New England the first flights of Surf Ducks are not particularly early, not much before the 18th of September, although a few odd birds pass before that. The average period appears to be September 20 (B. P. Clark records; Mackay, 1891; etc.). This is quite a different story from that of the White-wing. The young and females come along about September 20, the main flight, however, between the 1st and 15th of October. These flights rapidly lessen in numbers after late October, as the great bodies of wintering birds gather south of Cape Cod and from there down the coast in all suitable spots to Cape Hatteras and even beyond.

The spring movement is earlier than with the White-wing and these ducks, so far as we know, do not cut inland along the New England coast. They fly overland with the American Scoters and part of the White-wings from the head of Buzzards Bay across the base of Cape Cod to Massachusetts Bay and very likely do the same at other points, but the main body keeps on eastward to southern Labrador at least. On the Pacific coast the main spring flight is up the coast and not across British Columbia as with the White-wing (A. Brooks, MS.).

A great deal remains to be worked out with this and the other Scoters, and it will be a long time before records from banded birds will do us much good because these ducks nest in such inaccessible places that they will be difficult to mark. Its scarce interior distribution enables us to guess that it cuts across to both the west and the east coasts farther north than the White-wing does. Either that or its dislike of fresh water prevents it from turning up on small ponds and rivers while on migration.





MAP 98. Distribution of Surf Scoter (*Oidemia perspicillata*)

Breeding range, dotted line; winter range, broken line  
Sporadic records indicated by crosses (X)







## GENERAL HABITS

THE Surf Scoter, better known in New England as the Skunk-head Coot, is so familiar to those who prowl about the seashore in autumn or winter as scarcely to need an introduction. In view of this fact it is surprising to find the confusion which exists in regard to its breeding range. This is true of all the Scoters, but so little had been done within the true breeding limits of this species that until Francis Harper secured specimens in 1920, the downy young had never even been described. The extent of the breeding range east of Hudson Bay has not been worked out and we do not really know whether the scattered observations of one or two travelers represent an important breeding region or not. But it seems to me probable that there really is a breeding center somewhere in Labrador.

Both on the water and in the air this is a clumsy-looking bird; perhaps it is the most ungainly of the three Scoters. Yet an old male with his brilliant carmine-and-yellow bill and his white neck- and forehead-patches cuts a striking figure. Females and immatures are not especially easy to pick out at long range with a field-glass, and are easily confused with the undeveloped plumages of the Black Scoter and sometimes even with female Scaups or Harlequin. It is difficult to estimate the relative numbers of the species in any great assemblage of sea ducks. The really old females usually show a whitish patch at the back of the head just under the black head-cap which very often is not brought out in illustrations. The white patch behind the eye, taken with the presence of one before the eye (often obscure), usually identifies the bird. The absence of white wing-patches separates it from the White-winged Scoter while the huge hollow bill is high at the base and characteristic in shape, but especially well marked in males only, both old and young ones.

This is a true salt-water duck, seeking deep, clean, fresh-water ponds for breeding. On migration it does not drop into small lakes nearly as often in relation to its numbers as the White-winged or the Black Scoter. It seems to be more of a sea duck even than the other two, but it is moderately plentiful, although less so than the White-wing in our Great Lakes system in autumn. It hugs the coast on migration farther to the north than the others and thus has quite a different inland dispersal.

WARINESS. Surf Scoters are very tame, especially young in early autumn, but they are not so absurdly foolish as the young of the White-wing.

A curious trait of feigning dead was noted once or twice by myself years ago and was recorded by Ray (1916). These were crippled birds which had been captured and placed in the boat apparently relaxed and absolutely lifeless. Five or ten minutes later these birds leaped overboard and vanished completely, too lively even to find again. I never shall forget my astonishment the first time this happened to me.



DAILY MOVEMENTS. Same as in the other Scoters which are largely day-feeders.

DIVING. The Surf Scoter feeds in the same places as the White-wing and at the same depths, that is from six or eight to thirty feet. The time under water is from fifteen or twenty to about forty seconds, much more irregular, Alford (1920) noticed, than the period above water.

Comeau (1923) thinks that they always use their wings under water and cannot rise to the surface fast enough without them. He explains the case of their drowning under water in summer from the fact that they were unable to use their moulted wings in rising! He mentions an instance of five hundred moulting Scoters drowning after a steamer went through their ranks and frightened them! L. M. Turner (1886) mentions their dying under water after long dives when wounded.

All the Scoters do at times open their wings just as they dive, but we do not know exactly how much the wings are used under water in healthy birds.

FLIGHT. These ducks get under way very slowly and while rising, the wings produce a deep whistling sound, though not so loud as in the Golden-eye. This sound dies away after a short flight. The migrating flocks are often enormous, especially in the spring. In the Bay of Fundy on April 25, Dresser (1871-81) saw flocks passing eastward one-half a mile long and one and a quarter miles wide. Resting flocks off St. Michael's, Alaska, were ten miles long and one-half to three-quarters of a mile broad (Nelson, 1887). The usual migrating autumn flock is much smaller, especially on the Atlantic coast, and the broods are smaller than with most ducks, seldom exceeding four or five.

ASSOCIATION WITH OTHER SPECIES. Although the young are more or less mixed up with other species on autumn migration there is little mixing with other kinds in spring, especially among flocks of breeding birds. So few other ducks nest in the rocky tundras of the central Barren Grounds that no doubt this Scoter has things pretty much to itself in those desolate regions.

VOICE. This Scoter is almost as silent a duck as the White-winged. In the courting season the males have a liquid explosive little note like *puk-puk*. Allan Brooks (*in litt.*) likens this noise to the sound of water dropping in a cavern. Nor is the female often heard from, although she does at times utter a rough guttural note like *krrrääk, krrrääk*.

The windpipe of this species more nearly resembles the White-wing's than it does that of the Common Scoter. It is a little shorter than the former and the upper dilatation is not quite so large. The tracheal bulb, an expansion of the trachea itself, and not, like the usual bony box, at the lower end of the trachea, is formed of



tracheal rings and is of somewhat different shape than that of the White-winged. It is also lower down on the trachea itself. There is no left-sided *bulla ossea* proper, as in most other ducks, although there is a slight dilatation at the lower end of the trachea (Langton, 1881; A. Wilson).

**Food.** Like the other Scoters, the Surf Coot feeds mostly on invertebrates, but like its relatives when visiting interior waters especially, it subsists to some extent on vegetation. Nearly one-tenth of the total food in 48 well-filled stomachs examined by the U.S. Biological Survey was vegetable. Three birds taken in Wisconsin in October had consumed wild-celery buds to an average extent of 84 % of their diet; they had eaten some pond-weeds also and seeds of water-shield, besides may-fly nymphs and larvæ of water beetles and drone-flies. In brackish water the Surf Scoter sometimes feeds on widgeon-grass, and in salt, on eel-grass and marine algæ.

In general, however, the food is animal. In a total of sixty stomachs examined, collected chiefly from Maine, Massachusetts, New York, Oregon, and Washington during the winter months, mollusks were far and away the commonest food. Bivalves, especially the common mussel, predominate, and one bird had eaten no fewer than 1080 small bivalves. The northwestern oyster (*Ostrea lurida*) is freely eaten where opportunity permits. Univalves and sea-slugs also are included in the molluscan food. Among other invertebrates eaten, crabs and barnacles are most numerous, but water-fleas, hydroids, sea-anemones and marine worms also are consumed. A Surf Scoter taken in Louisiana in November, contained besides the ordinary crabs and snails, remains of a brittle-star (ophiuran) and sea-cucumber (holothurian), quite unusual items of bird food (W. L. McAtee, MS. notes).

**COURTSHIP AND NESTING.** The courtship and display of this Scoter are seldom seen, most likely because it lives in waters far from the strolling observer armed with his opera-glass. Their general nature was described by W. L. Dawson and Bowles (1909), and later by A. Brooks (1920; *et in litt.*) and by Alford (1921). On the coast of British Columbia, Brooks says that some sort of courtship is carried on all winter, often six or eight males with one female. Both sexes chase each other on the water with the head held very low, frequently making short dives and flapping the wings when they emerge. The males at that time utter their short note, *puk-puk*. In May, Brooks noted the birds courting in central British Columbia lakes. The males whirled around in small groups with the head held high and the bill turned down. Neither the males of this nor of the White-winged Scoter chase the females on the wing during the winter or spring months, behavior which is so characteristic of the Black Scoter.

The nesting season in the far North, on the Anderson River and along the east side of the MacKenzie basin, extends from the 6th of June until well into July, most



of the few clutches that have been taken dating from late June. Harper (MS.) was fortunate enough to take a female with her brood near the eastern end of Lake Athabasca on July 27. These young were at least ten days old, so that the eggs must have been laid between June 12 and June 20. MacDonald found some heavily incubated eggs at Great Slave Lake on June 23, 1923, an early date for that region (W. Rowan, *in litt.*).

What little we know of the nesting habits is still to be taken from R. MacFarlane's (1891) very brief notes. He describes the nest as similar to that of the White-winged, but containing fewer feathers and less "hay." The usual clutch is small, varying from five to seven, and once eight eggs. The nests were all near fresh water on dry ground, usually sheltered under dwarf spruces and "pines."

The eggs are ivory white to pale buff and, when fresh, probably have a distinct pinkish tinge like those of the White-winged Scoter. In length they vary from 57 to 58.4 mm., the breadth being about 40.6 (Baird, Brewer and Ridgway, 1884; J. Grinnell, Bryant and Storer, 1918).

The incubation period is unknown, and the behavior of the males while the female is sitting has not been closely observed. They undoubtedly desert their mates as do the other Scoters.

"On July 26 a band of four was seen some miles to the eastward of Crackingstone Point. While encamped on the north shore of the lake, about eight miles northeast of Moose Island and a dozen miles west of Beaver River, we located a breeding haunt of this species. This is a small lake situated among rocky, sparsely wooded hills at an elevation about 75 feet higher than that of Lake Athabasca, and only a couple of hundred yards distant from it. It is about three-eighths of a mile in length by one-fourth of a mile in width. On one side it is bordered by a swamp. Elsewhere the shore (like the lake bottom) is sandy and rocky. The water is fairly clear. The depth is shallow near shore, and undetermined in the middle. A considerable portion of the lake is grown with yellow pond-lily (*Nymphaea*). No fishes were observed, but there were tadpoles and an abundance of invertebrate life, such as insect larvæ and leeches.

"On July 27 a band of four adults, including none in full male plumage, was seen here; and presently a female appeared, accompanied by four large downy ducklings. (It was especially in quest of Surf Scoters in natal down that our trip toward the eastern end of Athabasca had been undertaken, since specimens of this age had been almost or quite unknown up to that time.) The young were already diving, and when I came out on the shore, some of them skittered ahead of the mother, apparently at her behest. On the following day we portaged a canoe to this body of water and embarked on it. Meanwhile a band of three adult Surf Scoters had flown in, but departed on our appearance. As we paddled toward the female with her brood of four, she led off at some distance in front of them, calling *krrrääk*, *krrrääk*, and





DOWNY YOUNG  
(Upper) BLACK SCOTER  
(Lower) SURF SCOTER







making a slight inclination of the head, apparently simultaneously with the note. The young proved very proficient under water, taking long dives and coming up in different directions. Sometimes, on reaching the surface in close proximity to the canoe, one would dive again so quickly as almost to escape notice. While swimming, they had a trick of tilting up their tails at an angle of perhaps  $40^{\circ}$ , in a manner somewhat suggestive of a Ruddy Duck. When one of them had been shot and was kicking on the water, the old bird came up to it, making short and shallow dives beneath it time and again, and calling with open bill. Probably she was thus endeavoring to induce it to dive, too. The canoe approached within perhaps a dozen yards before she flew off. On rising from the water she made a decided whistling sound with her wings, but this subsided considerably after she had gained headway. On July 31 the old bird and the last remaining young one, as well as an additional adult female, were collected here. The trachea of a male duckling showed no asymmetrical enlargement, such as is characteristic of male ducks in general, even at the earliest age" (Harper, MS.).

**STATUS.** On the Atlantic coast the great numbers of this species have been discussed in the accounts of the other Scoters. As seen on the New England coast in autumn they represent from 45% to 55% of all three Scoters. Some sportsmen consider them less plentiful than the White-wings, but I should say that on the whole they are decidedly the most numerous.

The different distribution of the Surf Scoter both during migration and in the winter makes it very difficult to generalize in regard to its status. On the Pacific coast it seems to go somewhat farther south than the other kinds and from Puget Sound north in winter and spring it is exceeded in numbers by the White-winged species.

All over the interior of this country it is far rarer than the White-wing, in fact it is more of a sea duck and follows the coast more closely than its relatives, both in spring and in autumn.

Occasional years come in New England when we see very few young and this we suppose denotes a bad breeding year. Such years are apt to affect all Scoters at the same time. According to Mr. B. P. Clark's records at Cohasset the following years were reckoned as very poor in young, resulting in poor shooting: 1879, 1884, 1885, 1888, 1901, 1902, 1906, 1914, 1915, 1918, 1922. I remember that the autumns of 1920 and 1921 were periods of great abundance, not only for Scoters but many other water-fowl, nearly all ducks, besides geese and Brant.

**ENEMIES.** Several naturalists have found this Scoter dying in great numbers of natural causes, especially on the Pacific coast. The birds described by Cooper (in Baird, Brewer and Ridgway, 1884) as floating in to the wharves, blind and decrepit,



were probably not merely superannuated, but suffering from parasites. A. Brooks (1920) mentions large numbers of this and the White-wing dying of intestinal parasites.

All the Scoters and Eiders are particularly liable to destruction by floating crude oil, on both our coasts. Most of the water-fowl picked up dead on New England coasts nowadays are Scoters, Eiders, Loons and Mergansers with the patches of black pitchy oil in their feathers.

**DAMAGE.** Examination of winter stomachs shows that in New England their preference is for black mussels and other shell-fish which have no economic importance. On the coast of Washington the northwestern oyster is eaten freely.

**FOOD VALUE.** There is no choice between any of the Scoters as articles of diet. The food value has been discussed in connection with the Black and the White-winged Scoters.

**HUNT.** The hunting of Scoters has already been dealt with in the accounts of the preceding species.

**BEHAVIOR IN CAPTIVITY.** No one, apparently, has ever attempted to keep these interesting birds in confinement.

**HYBRIDS.** None has been described.



# LABRADOR DUCK

*CAMPTORHYNCHUS LABRADORIUS* (GMELIN)

(Plate 78)

## SYNONYMY

*Anas labradoria* Gmelin, Linné's Systema Naturæ, ed. 13, vol. 1, pt. 2, p. 537, 1789.

*Anas labradora* Latham, Index Ornith., vol. 2, p. 859, 1790.

*Rhynchaspis labradora* Stephens, General Zoology, vol. 12, pt. 2, p. 121, 1824.

*Fuligula labradora* Bonaparte, Annals Lyceum Nat. Hist. New York, vol. 2, p. 391, 1826.

*Somateria labradora* Boie, Oken's Isis, p. 329, 1828.

*Camptorhynchus labradorus* Bonaparte, Comparative List, p. 58, 1838.

*Kamptorhynchus labradora* Eyton, Monograph Anatidæ, p. 57, 1838.

*Fuligula grisea* Leib, Journ. Acad. Nat. Sci. Philadelphia, ser. 1, vol. 8, p. 170, 1840.

*Camptolaimus labradorus* G. R. Gray, List Genera Birds, ed. 2, p. 95, 1841.

*Camptolæmus labradorus* Lichtenstein, Nomenclator Avium, p. 103, 1854.

*Camptolæmus labradorius* Baird, Birds No. Amer., p. 803, 1858.

*Anas labradorica* Hall, Canad. Naturalist, vol. 7, p. 427, 1862.

*Somateria labradoria* Rowley, Ornith. Miscellany, vol. 2, p. 205, 1877.

*Camptorhynchus labradoria* Rowley, Ornith. Miscellany, vol. 2, pl. [6], 1877.

*Fuligula labradoria* Seebohm, Hist. British Birds, vol. 3, p. 611, note, 1885.

*Camptolæmus labradoricus* Sclater, Proc. Zool. Soc. London, 1880, p. 528.

*Camptolaimus labradorius* Stejneger, Standard Nat. Hist., vol. 4, p. 151, 1885.

## VERNACULAR NAMES

*English:* Labrador Duck, Pied Duck, Sand-shoal Duck, Skunk Duck, Fool Duck.

*German:* Labrador Eiderente, Labrador Ente.

## DESCRIPTION

**ADULT MALE:** Head, neck, jugulum, scapulars and wings, except primaries, white; longitudinal stripe on the crown and occiput, collar around lower part of neck, the back, rump, upper tail-coverts, primaries, tail and entire lower parts black, the tail and lower surface, except laterally and anteriorly, more grayish; breast and sides dusted with whitish points; the black collar composed of soft velvety feathers; on the anterior part of the cheeks a patch of stiff feathers; scapulars and tertials edged with black (Salvadori, 1895).

Iris reddish hazel to yellow. Bill with the basal part and the region around the nostrils pale yellow or orange; remainder of bill black to blackish-brown color, the line between the black and the yellow sharply defined. Legs and feet: There is so much variety in the accounts of the colors of these parts that it is hard to get a correct picture. Wilson says the fore part of the legs and ridges of the toes were pale whitish ash; hind part the same bespattered with blackish; web black. Hall spoke of the



tarsi as yellow, Pennant (1785) called the legs black. Rothschild (1907) shows a plate in which the legs are colored almost black; while the fine plate in Rowley (1877) pictures them as yellow.

Wing 215 mm.; bill 44; tarsus 40

**ADULT FEMALE:** Uniform light brownish gray all over, but inclining to a bluish-slate tone on the mantle and scapulars. Chin and throat paler than sides of the head. Back rather slate-colored, changing into a sandy brown on the rump and upper tail-coverts. Tail very dark brown, nearly black. Wing-coverts same color as mantle, except the outer feathers of the last row, which are white, forming, with the white secondaries, a large white speculum-patch. Primaries very dark brown, almost black on the outer web. Whole lower side almost uniform light gray-brown except the under tail-coverts which are a darker gray (specimen in Museum of Comparative Zoölogy, No. 80165, formerly in Brewster collection). Color of bill probably nearly as in the male.

Wing 208 mm.; bill 40; tarsus 38.

**YOUNG IN FIRST (JUVENAL) PLUMAGE:** Apparently almost exactly like the adult female, the sexes probably difficult to tell apart during their first autumn (juvenal) plumage. It is entirely possible, however, that the young male had the white throat in his first dress and also a somewhat darker occiput and face.

**IMMATURE MALE:** Judging by the very few specimens which I have examined closely (and most of these have no dates), the young male goes through his first winter without a very marked advance toward maturity. No doubt there was great variation in this respect, but a young male with a freshly moulted tail (Museum of Comparative Zoölogy, No. 80164, formerly in the Brewster collection) was most likely taken late in the winter or early in the spring. There are others about at this or slightly earlier stages in various museums. The head is darker and grayer than in the adult female and white feathers have begun to come in around the eyes, sides of the crown and along the nape. The whole throat is pure white, and around the neck is a darker ring, indicating the position of the black neck-ring of maturity. Below this again, another broad white band is indicated, the tips of the feathers being brownish, so that the adult white breast-shield is clearly defined. Black feathers are beginning to invade the upper mantle, and there are even a few in the lower mantle, mixed with the slaty-colored feathers. Below the white upper breast-band and continued around to the sides of the breast are the first of the black feathers of the adult under parts. These black feathers, and some dark-brownish ones, are beginning to come in along the sides, even as far as the sides of the rump. The scapulars and wing-coverts are about as in the female, although in this particular specimen they happen to be somewhat more bluish. The speculum is the same as in the female, and the lower parts are of the same tone. It seems therefore apparent that plumage changes appeared first on the sides of the head (throat?) and around the neck-ring and upper-breast region as they do in so many other ducks, as well as on the upper mantle. Evidently the tail was sometimes moulted rather early, but changes in the wings, scapulars, and lower mantle and back came much later. It is doubtful whether the feathers of the abdomen were moulted before the bird was a year old, or nearly a year.

**ADULT MALE, ECLIPSE PLUMAGE:** Unknown.

**YOUNG IN DOWN:** Unknown.

## DISTRIBUTION

THE Labrador Duck, of which so little is known, appears to have been entirely a resident of the Atlantic seaboard. It became extinct about the year 1875. The only inland record, one for Michigan, is rightly called in question by Barrows (1912). Most of the specimens still extant in museums





LABRADOR DUCK  
Immature Male

Adult Male

Adult Female







appear to have come from the vicinity of Long Island Sound. According to Audubon the species occurred in winter as far south as Chesapeake Bay and in summer as far north as Labrador, but we do not know what this statement is based on. Little can be said to supplement this except that, so far as we know, the bird was more common on the New England coasts in winter than elsewhere and that very possibly it nested in Labrador or even farther north (see Rowley, 1877; Dutcher, 1891, 1894; Hartlaub, 1895; Rothschild, 1907).

### GENERAL HABITS

At this late date there is little hope that any more information about this duck will come to light. It is barely possible that another mummified specimen or two may be unearthed, but most unlikely that any such specimen would have any data with it that would add anything to our present meager knowledge. It is best to outline what we do *not* know about this duck, for the rest will occupy little space.

Nothing has come to light which might give us an idea of the breeding range or breeding habits or of the status of the bird in the very earliest times; this in spite of there being a good many vague statements covering these points in earlier works. From the time it was first mentioned it was probably always rare, although apparently from 1840 to 1860 a fair number made their way into the New York market. Nor do we know anything concerning the food habits, a part of the life-history which might be of great interest because this duck has a curious bill and may possibly have been dependent on a very different diet from that of the sea ducks in general.

It was first made known to science in 1788 and in 1792 it was figured by Pennant from a specimen taken in Connecticut. Rowley (1877) was the first to gather all the then available information and little has been added since his day that would throw any light on the causes of extinction.

Evidently in Audubon's and Wilson's time it was not a common bird and by the sixties it was well known to be a rarity. The latest possible date of capture is December 12, 1878, for a specimen since lost but recorded by Dr. W. H. Gregg (*American Naturalist*, vol. 13, p. 128, 1879). It was said to have been shot by a boy in an overflow of the Chemung River, near Elmira, New York. The last known and dated specimen was taken, apparently on Long Island waters, in the autumn of 1875 by J. G. Bell (♂, No. 77126, U.S. National Museum). Another, even more certainly, was shot as late as 1871 by Mr. Simon F. Cheney on Grand Manan Island and obtained by Mr. George A. Boardman for the Smithsonian Institution (Dutcher, 1894). Still another seems to have been taken in the Great South Bay about 1866 (letter from D. G. Elliot in Rowley, 1877), and Elliot had several in the flesh from 1852 to 1862. Most of the known specimens have no dates or localities and must have been gotten between the forties and sixties of the last century, some of course much earlier. They were, it seems, nearly all from New England, New York, or New Jersey waters except those from Grand Manan and one (now in the Tring Museum)



which is known to have been shot in the St. Lawrence River near Montreal in 1862.

That this duck vanished very quickly when it began to get really scarce appears probable, and there is some evidence to show that it was fairly common at times in the New York market up to the late thirties or forties. We do know certainly that it was a rather stupid duck and that it was supposed to feed on shell-fish. Alexander Wilson described the trachea and there is a sternum in the collection of the Cambridge Museum, England.

The theories, for that is all there is to go on, of its disappearance are scarcely worth considering because we have no evidence that would make one man's guess better than another's. Possibly this was a vanishing species to start with; a species whose breeding ground was restricted to one or two islands in the Gulf of St. Lawrence or in southern or eastern Labrador, in which case its nests might have been robbed so often by eggers and fishermen that it finally "snuffed out" before its time. It does, however, seem unlikely that a sea duck would ever be confined to such a contracted breeding range. Coastal shooting in autumn and winter from Nova Scotia to Long Island Sound might have had *some* effect on its numbers, but this seems to me even more unlikely. A far more reasonable view, suggested to me by Mr. Outram Bangs, is to suppose that the Labrador Duck had very specialized food habits and that changes in the molluscan fauna, brought about by increased population along our coast, may have proved disastrous. Such changes in minute shell-fish are known to have taken place.

The duty now devolves upon us of enumerating as best we can a dreary catalogue of the few existing specimens. I have refrained from including a complete bibliography because nearly all recent references are matters of historical interest only.

The list of American specimens is made up partly from Dutcher's list (1891) but rechecked owing to numerous changes since that time.

*American Museum of Natural History, New York*

|                  |   |                                                                                           |
|------------------|---|-------------------------------------------------------------------------------------------|
| 2 adult males    | { | Mounted in case. Originally Wied collection and Lawrence collection — one as late as 1865 |
| 2 immature males |   |                                                                                           |
| 1 adult female   |   |                                                                                           |
| 1 adult male     | { | skins                                                                                     |
| 1 immature male  |   |                                                                                           |

*Brewster-Sanford Collection in American Museum of Natural History*

- 1 nearly adult male loaned to collection from Vassar College, Poughkeepsie, New York — mounted
- 1 immature male from Philadelphia Academy collection, originally Rivoli collection, in exchange for a specimen (skin) formerly in Boston Society of Natural History (Brooks, Auk, vol. 29, p. 389, 1912)

*Museum of Comparative Zoölogy, Cambridge, Massachusetts*

- 1 adult female skin from W. Brewster collection, purchased in 1878 from B. A. Hooper
- 1 juvenal male skin, from W. Brewster collection, originally in collection of George B. Warren, of Troy, New York



*Boston Society of Natural History, Boston, Massachusetts*

- 1 nearly adult-plumaged male, supposed to be the one secured in Boston Harbor in 1850 and presented to the Museum by Theodore Lyman — mounted

*Long Island Historical Society, Brooklyn, New York*

- 1 nearly adult male (second winter?), No. 269, shot by Nicholas Pike, at mouth of Ipswich River, Massachusetts, in November, 1844 (?)

*Collection of the University of the State of New York, Albany, New York*

- 1 adult male received in 1850 from H. Casimir De Rham (see 4th Annual Report State Cabin Natural History, 1851, p. 38) — mounted  
 1 adult female, somewhat faded and lacking a few tail-feathers (no records; probably specimen mentioned in the 1st Report State Cabinet, 1848, p. 20) — mounted

*University of the State of Vermont, Burlington, Vermont*

- 1 adult male, good plumage and satisfactorily mounted; no data; probably from Philip Brasher collection and taken on Long Island waters

*John E. Thayer Collection, Lancaster, Massachusetts*

- 1 adult male (mounted). Purchased from Liverpool Museum; originally obtained from Gould on January 16, 1833

*Academy of Natural Sciences, Philadelphia, Pennsylvania*

- 1 male juvenal mounted; from L. C. Sanford in exchange; originally from Boston Society of Natural History collection; no data. See Brooks, Auk, vol. 29, p. 389, 1912  
 1 male juvenal mounted; no data; probably taken locally  
 1 female mounted; no data; probably taken locally. These two last probably local birds; that is, from Pennsylvania or New Jersey.  
 1 male, full-plumaged adult mounted; from collection of George A. Carpenter of Philadelphia; see Auk, vol. 10, p. 263, 1893; no data

*Field Museum of Natural History, Chicago, Illinois*

- 1 nearly adult male mounted; from Charles B. Cory collection — originally George A. Boardman collection — shot at Grand Manan Island; slightly damaged around right eye  
 1 female adult mounted, from same source as above individual; good specimen but said to be in need of degreasing; shot at Swampscott, Massachusetts, in 1862, by Arthur Thomas? (see Dutcher, 1894)

*U.S. National Museum, Washington, D.C.*

- 1 male adult, No. 1972, skin from Baird's collection, given to him by Audubon, figured by Audubon in his plate of the species. Is this one of a pair presented to Audubon by Daniel Webster who shot them "on the Vineyard Islands"?  
 1 female not adult, No. 2733, mounted now; no exact date but also received by Baird from Audubon in 1846. This also appears to be the specimen figured by Audubon in the Birds of America and probably one of the pair shot by Daniel Webster. There was some doubt about the sex of the specimen (see Baird, Brewer, and Ridgway, 1884, p. 64) but later this point was revised in edition of 1891, when Mr. Ridgway called it an adult female.  
 1 male adult, No. 61300, received as a mounted bird from the American Museum of Natural History



and catalogued in 1872; said to have been from collection of D. G. Elliot, mounted (received by exchange, purchase, or gift?)

- 1 male immature, No. 77126, bought as a (poorly) mounted bird from George N. Lawrence. Locality said to be Long Island and date autumn of 1875; collected by J. G. Bell according to Museum catalogue; catalogued February 9, 1879, and is still in exhibition collection, mounted. The locality, "North Atlantic," so Dr. Richmond says, is not on the labels (see Dutcher list, 1891, p. 210), so that this was probably a general locality supplied to Mr. Dutcher at the time.

*Museum of Natural History Society of Montreal, Quebec*

- 1 male immature, mounted (Dutcher, 1894, p. 4)

*Dalhousie College, Halifax, Nova Scotia*

The two specimens listed by Dutcher (1891) as existing in the Museum have since been carefully looked for (1909) by persons competent to judge. The only specimen found was apparently fraudulent and made up from other species.

Total in United States, 28. Mr. Dutcher listed 6 other specimens which had been lost or destroyed. The list of foreign specimens is mostly from Rothschild's list (1907).

*Dresden Museum, Germany*

- 1 female (in Dresden before 1850; see Auk, vol. 9, p. 389, 1892), also two doubtful eggs (Rothschild, 1907)

*Munich Museum, Bavaria*

- 1 male, North America, received in 1851 when the collection of the Duke of Leuchtenberg was turned over to this museum (information through Dr. Alfred Laubman, Zoologische Sammlung, 51 Neuhauserstr.)

*British Museum (Natural History), London*

- 1 male adult, presented to the Museum by the Hudson's Bay Company about the year 1835  
1 female adult, purchased from Verreaux in 1863

*Liverpool Museum, Liverpool, England*

- 1 male adult, purchased from Mr. Gould  
1 female adult presented by T. C. Eyton, Esq.; no date  
1 male immature

*Strickland Collection, Cambridge, England*

- 1 male adult in good condition

*Colonel Wedderburn's Collection*

- 1 male shot by him in Halifax Harbor; sternum in Cambridge Museum

*Leyden Museum, Leyden, Holland*

- 1 male, obtained in 1863 from Prince of Wied  
1 female



*Berlin Museum, Germany*

1 (sex?)

*Museum of Natural History, Paris, France*

1 male, presented in 1810 by M. Hyde; feet somewhat decayed

*Tring Museum, Tring, England*

1 adult male shot in the Bay of La Prairie, 1862, and purchased by Mr. Thompson. Mr. Dutcher bought it from Mr. Thompson and sold it to Lord Rothschild

1 immature male; purchased from Gordon Plummer of Brookline, Massachusetts, shortly before his death in 1893 (Dutcher, 1891, p. 206)

*Amiens Town Museum, France*

1 adult male (Auk, vol. 14, p. 87, 1897)

*Dublin, Ireland*

1 fine mounted male (Rothschild, 1907)

*Brussels, Belgium*

1 male adult

*St. Petersburg (Petrograd), Russia*

1 male adult

*Heine Museum in Germany*

1 poor specimen

*Vienna, Austria*

1 male adult; locality, New York

1 female bought from Brandt in Hamburg in 1846

*Note:* It has been erroneously reported that there is a specimen in the Zoölogical Museum of Strasbourg, but I am informed through the present Director that this is not the case.



## STELLER'S EIDER

*POLYSTICTA STELLERI* (PALLAS)

(Plates 79, 80, 82)

### SYNONYMY

*Anas stelleri* Pallas, Spicilegia Zool., fasc. 6, p. 35, pl. 5, 1769.

*Anas dispar* Sparrmann, Mus. Carlsonianum, pls. 7, 8, 1786.

*Anas occidua* Bonnaterre, Encyclop. Méthodique, vol. 1, p. 130, 1790.

*Clangula stelleri* Boie, Oken's Isis, p. 564, 1822.

*Fuligula dispar* Stephens, General Zoology, vol. 12, pt. 2, p. 206, 1824.

*Fuligula stelleri* Bonaparte, Ann. Lyceum Nat. Hist. New York, vol. 2, p. 394, 1826.

*Polysticta stelleri* Eyton, Cat. British Birds, p. 58, 1836.

*Stellaria dispar* Bonaparte, Comparative List, p. 57, 1838.

*Harelda stelleri* Keyserling and Blasius, Wirbelthiere Europ., pp. lxxxvii, 230, 1840.

*Eniconetta stelleri* G. R. Gray, List Genera Birds, p. 75, 1840.

*Stelleria dispar* Bonaparte, Cat. Met. Uccelli Europ., p. 74, 1842.

*Somateria stelleri* Jardine, British Birds, vol. 4, p. 73, 1843.

*Somateria dispar* Yarrell, Hist. British Birds, ed. 2, vol. 3, p. 305, 1845.

*Heniconetta stelleri* Lichtenstein, Nomenclator Avium, p. 103, 1854.

*Polysticta dispar* Collett, Vidensk. Selskab. Forhandl., Christiania, p. 180, 1868.

### VERNACULAR NAMES

*English:* Steller's Eider, Steller's Duck, Western Duck, Soldier Duck, Kamchatka Duck, Variegated Duck.

*German:* Scheckente, Scheckige Ente, Steller's Ente, Kamtschatka Ente.

*French:* Eniconette de Steller, Fuligule disparate.

*Norwegian:* Stellers and.

*Swedish:* Stellers and, Alförrädare.

*Finnish:* Stellerin alli.

*Japanese:* Ko-kewatagamo.

*Eskimo:* Ignikiri, Unogohluk, Ignikaukto.

*Samoyede:* Waikaga.

### DESCRIPTION

**ADULT MALE:** Head and upper neck pure white with a silky sheen, lores and an occipital band light olive green; a ring around the eye, the chin and throat, brown-black. A spot on each side of the occipital tuft and a broad collar around the neck connecting with the mantle black, with a dark-purple gloss. Center of mantle black, outer part white, merging with the buff color on the sides of the breast.





Allen Brooks.

STELLER'S EIDER

Male

Female

SPECTACLED EIDER

Female

Male







Middle of the back, the rump and upper tail-coverts black, with more or less purplish gloss. Upper scapulars mostly white but some mixed with black, and some with violet-purple longitudinal streaks; longer scapulars tapering and with iridescent purple outer webs and white inner webs. Below the black neck-color is a narrow white ring which is continuous with the white mantle-color and fades into the buff color of the breast. This buff color spreads down the sides and flanks but deepens to a rich fox color on the lower breast and sides of the abdomen, and becomes dusky black over the abdomen and on the under tail-coverts. On each side of the breast is a black spot about 20 mm. long. Wing-coverts white, secondaries forming a broad purple speculum with their outer webs, and having a white band at their tips. Inner secondaries curved or falcated. Primaries brown; under wing mostly white; axillars white.

Iris dark brown to red brown. Bill blue-gray or lead-color, lighter toward the tip. Legs and feet dark blue-gray with the webs black.

Wing 210-225 mm. (rarely up to 230 according to Hartert); bill 37-42; tarsus 36-40.

Weight: Not recorded.

**ADULT FEMALE:** General color dark brown above and below. Top of head and nape dark sepia, with indistinct whitish or buff barring. Lores, sides of head and neck and throat rusty brown, almost pinkish and more or less barred and spotted with darker and lighter shades. Around the neck a broad, though indistinct, collar of a darker color, merging into the dark brown of the upper parts. Feathers of mantle and scapulars with concealed markings and having their tips gray or gray-brown. Back and rump black, barred with light brown or gray. Upper tail-coverts black with very dark brown barring; tail black, upper breast barred like the mantle, shading rapidly into the rich chestnut brown of the breast, abdomen and sides, and the dusky black of the lower abdomen and under tail-coverts. Wing dark brown, the smaller wing-coverts barred with white. Greater coverts broadly tipped with white, forming a white anterior speculum-band. Speculum on the secondaries deep purple bordered behind by a white band. Inner secondaries curved downward as in the male. Primaries like the male's, under wing-coverts browner than in the male; axillars white.

Colors of soft parts apparently very similar to those of the male: iris dark brown; bill dusky; legs and feet blue-gray to dusky.

Wing 210-218 mm.; bill 37-42; tarsus 36-40.

**MALE AND FEMALE IN FIRST (JUVENAL) PLUMAGE:** No specimens at hand but described as like the adult female except that the feathers of the upper parts have narrower and paler edges, and the under parts are much lighter in color. Under parts ash-white, the feathers with broad sub-terminal sepia bars and edged with cinnamon buff or pink-cinnamon. Wing as in adult female but purple speculum ill defined, the outer and most of the middle secondaries (in some all) black-brown or sepia. Secondaries not so curved and with much narrower white tips; greater coverts with a narrower white band. Tail-feathers blunt at their tips.

**IMMATURE MALE:** At first like the female, but by November changes may begin. Specimens in the first winter are rare in collections and this account is based on observations of others. The young male does not acquire a plumage approaching maturity the first winter and spring, following the Eiders in this respect. According to Millais the change proceeds slowly until February, when a general paleness, due to new feathers and fading of old feathers is noticeable. The long scapulars 'become' purple, the chest is much lighter and the lower chest takes on part of the rich sienna tint of the adult. One or two white feathers come in on the upper scapulars, chest or fore neck. In advanced birds the black collar is seen coming in on the neck with a few of the feathers metallic blue. Lighter feathers also appear on the cheeks and crown and some black appears on the chin and throat. By February some of the long curled inner secondaries may appear, similar to those in the adult male,



but tipped with a pale sandy brown. Not all young males reach such a stage in February, as some specimens taken in the same month are practically as in juvenal plumage. Specimens taken in June may have progressed little beyond the stage described for February

**YOUNG MALE IN FIRST SUMMER:** Not examined, but apparently it goes into a first-year eclipse which is very different from adult eclipse. Young males in their second autumn are not available but it is doubtful whether they reach full maturity until their second spring.

**ADULT MALE IN ECLIPSE:** This has been partly described and figured by Millais and I have an interesting specimen before me taken July 26 in St. Lawrence Bay, eastern Siberia, which is far enough advanced toward an eclipse to show what is going to take place. I am also indebted to Lord William Percy for information on this point and opportunity to see his collection. The summer (eclipse) plumage is certainly not assumed as a rule until late, for I have specimens all through June and some up to July 7 which show absolutely no change. The July 26 specimen in the Museum of Comparative Zoölogy and one in the Percy collection taken on the same date and at the same place, show early and late stages of this plumage. The first changes are on the fore part of the crown, sides of the face, throat and a region around the neck just forward of and over the black neck-ring. Dull brown or gray-brown feathers appear on these parts, gradually obliterating the white cheeks and crown and the black throat and chin. The long ornamental scapulars are lost rather early, and dull-black feathers begin to appear on the neck-ring, upper breast, sides of breast and flanks. Finally the whole head and neck become plain gray, with chin more or less black and a few white feathers on the sides of the head only. The upper breast, sides of breast and flanks become black or blackish brown while the lower breast, abdomen and under tail-coverts show no marked color change. The mantle, back, rump and tail also remain nearly as before, but the scapulars are replaced by feathers which are nearly all black. The wings are probably not moulted until late August, perhaps not until September in many cases.

**YOUNG IN DOWN (Plate 80):** A specimen about ten days old (Point Barrow, Alaska, 1917, collection A. C. Bent), shows a coloring which may be described as dull, dingy brown all over the upper side and darker, nearly black on the crown. This brown color fades into a slightly paler color on the face and throat and almost to a clear dark gray on the abdomen. Like the young of the Scoters and Eiders there are no white dorsal patches. The only characteristic mark is a pale buff-brown streak extending back from the eye for about 10 mm. There is also a very narrow light spot on the lower eyelid and a suggestion of a small pale spot just above and forward of the eye. These young are easily separated from the young of the true Eiders by the absence of prolonged loreal and frontal feathering. In other words, the feather edge is nearly straight around the bill. The bill itself is very high at the base, rather narrow and inclined to be hooked over toward the tip. The downy young of Steller's Eider has a very close resemblance to that of the Black Scoter. However, in the Black Scoter the bill is much broader and heavier, there is no light streak behind the eye (only a spot under it) and the chin and throat are a paler gray. The general coloration of the upper parts and the remainder of the lower side is almost exactly the same.

## DISTRIBUTION

**STELLER'S EIDER** is one of the less common Arctic ducks with a rather restricted range. Its regular breeding habitat is on the Arctic coasts of Alaska and eastern Siberia, while during the winter months it moves about in search of open waters, frequenting the northern coasts of Finland and Norway and the islands of the Bering Sea.

## BREEDING RANGE

Though there are several records of the nesting of this Eider in the vicinity of Varanger Fjord in Norway, none seems to be trustworthy, with the possible exception of that given by Goebel (1902),



who found nests but no eggs on the Rybachi peninsula. A few may nest on Nova Zembla (Bilke-wicz, 1906) and some have been seen on the Yalmal peninsula (Zitkov, 1912). The regular breeding range consists of the great Arctic tundra from the Taimyr peninsula eastward. A. T. von Middendorff (1853), Baldamus (1853) and Walter (1902) have recorded its nesting in the Taimyr region while Bunge (1883; von Bunge and von Toll, 1887) and Birulia (1907) discovered nests about the mouth of the Lena and saw great numbers on the New Siberian Islands during the summer. These latter birds were probably immature, non-breeding individuals.

The center of abundance during the nesting season seems to be on the Arctic coast east of the Kolyma. Nelson (1887), W. S. Brooks (1915), Thayer and Bangs (1914), Riley (1918) and William Percy (*in litt.*) all record it as common and breeding on that coast. Specimens have been taken in the Anadyr basin in late May (Bianchi, 1908) and on the Gichiga River in June (J. A. Allen, 1905), but I am not aware of any record of actual breeding on the Pacific coast of Asia, including Kamchatka.

Though Dall (1874) reports a nest found on Unalaska and Littlejohn (U.S. Biological Survey) claims to have recently discovered a few breeding at Morzhovia Bay, Alaska peninsula, I think these records must be regarded as very questionable. The Alaskan breeding range extends regularly from Hooper Bay and the mouth of the Yukon northward along the coast, especially about Point Barrow and Barter Island (Murdoch, 1885; Nelson, 1887; R. M. Anderson, 1917), while occasional birds have been seen in summer as far east as Demarcation Point (W. S. Brooks, 1915) and Cape Bathurst (Stefánsson, 1913). Non-breeding summer residents are not rare on the Pribilofs (W. Palmer, 1899) and on other islands of the Bering Sea.

#### WINTER RANGE

At the approach of the winter months there seems to be a very considerable migration westward along the Arctic coast to the open waters of northern Finland and Norway. At this season it is moderately common about Varanger and Porsanger Fjords and may be found as far west as Tromsø (Schaanning, 1913; Schiöler, *in litt.*). Others are found on the coasts of the Bothnian Gulf, south as far as Skane and the island of Gothland (Nilsson, 1858; Wallengren, 1854). It is a rare bird on the Gulf of Finland, though some ten specimens were recorded from the vicinity of Helsingfors in the period from 1838 to 1896 (Palmén, 1876; Palmgren, 1913), and stragglers have been taken about the mouth of the Neva (Büchner, 1897; Bianchi, 1907), and once on the coast of Esthonia (Loudon, 1910a). Before 1850 specimens were not infrequently taken about Danzig, but there are no records from that vicinity for recent years (Naumann, 1896-1905; Hartert, 1920a). Seeger, Höpfner and Bieber (1909) report one taken near Frankfurt. Some dozen individuals have been recorded from Denmark (Kjärbölling, 1850; Dresser, 1871-81; Naumann, 1896-1905; L. Schiöler, *in litt.*) and others are said to have been shot on the east coast of Norway (Millais, 1913). Gätke (1895) has recorded four examples taken on Helgoland about the middle of the last century. There is but one record of its occurrence in France, between Calais and Boulogne in 1855 (Degland and Gerbe, 1867), and but two for England, namely, in Norfolk, 1830 (Yarrell, 1831) and in Yorkshire in 1845 (Bell, 1846).

Stragglers have been taken at Disco Bay, West Greenland, in 1878 (Reinhardt, 1882) and twice near Godbout, Quebec, in 1898 (A. K. Fisher, 1900). Off the Alaska coasts it is very common during the winter months especially on the Kenai peninsula, Kadiak Island, the Shumagins and thence westward throughout the Aleutian chain (Dall, 1873, 1874; Nelson, 1887; Bretherton, 1896; Littlejohn, U.S. Biological Survey). On the Asiatic side the species is abundant in winter on the Commander Islands (Stejneger, 1885; Hartert, 1920a). It is found more sparingly on the coasts of Kamchatka (von Ditmar, 1900; Barrett-Hamilton, 1900) and on the Kuriles (Stejneger, 1898; Blakiston and Pryer, 1882); it has been once taken on Saghalin Island, in August, 1910 (Buturlin, 1915a) and twice on Yezo (*vide* Hartert, 1920a).



## MIGRATION

THIS, like the King Eider, is remarkable for sporadic flights a long distance west of any known nesting area. We do not know why an Asiatic species of duck should be so often taken in winter in north-western Europe. Its straggling to Greenland and the Gulf of St. Lawrence is even more peculiar.

In winter it arrives at Bering Island about November 1 and leaves during April,— the last May 25. They leave Point Barrow from the 1st to the 15th of August, — latest September 17 (Murdoch, 1885). The last leave St. Michael's about the middle of October. About Kadiak Island they winter from November to early April (Bretherton, 1896).

In the spring this duck moves along the Arctic coasts in May, is extremely common all along the north coast of the Siberian peninsula in early May and was seen as far west as the New Siberian Islands on the 2d and 15th of June (Birulia, 1907). They are not noted at Point Barrow until early June. These dates were: June 5, 1882; June 11, 1883; June 9, 1898.

They were first seen at Point Dall, extreme western Alaska, in 1924, on May 18, and by May 27 were fairly common in tundra pools. This was the only one of the three Eiders nesting there which had birds of the previous year mixed with the mature birds, but the latter were jealous and kept the younger ones at arm's length.

## GENERAL HABITS

THIS handsome little sea duck, for so long almost unknown to Americans, is obviously too different from the true Eiders even to go by that name. It is doubtful if it is at all closely related to any of the other sea ducks.

This is one of those fearless species which seem to delight in the roughest, deepest and rockiest coast-lines, where clear water comes close to the land. It is a fresh-water breeder, never found in coast-line colonies like the Common Eider.

WARINESS. Steller's Eiders behave very differently from all other Eiders and in respect to wildness are very much like the Golden-eye. They are especially wild when in large flocks during the moulting season (Murdoch, 1885). Stejneger (1885) during his stay at Bering Island found the Steller's Eider next to the Common Golden-eye the shiest bird of the whole duck tribe. Flocks of adult males were almost always farther out at sea and well away from the females and younger males. About their nesting grounds they are tamer, as is so often the case with other ducks.

DAILY MOVEMENTS. In June, Lord William Percy (*in litt.*) found the flocks of males collected offshore where they spent the day "drifting along a reef of rocks until carried into deep water by the tide. After resting for some time parties of from twenty to fifty would leave the flock at frequent intervals and fly up to their starting place, and so in half an hour the whole flock would be over the reef again." They are, of course, day-feeders like the other Eiders, Long-tail, Golden-eyes and Scoters.

SWIMMING AND DIVING. On the south shore of the Alaska peninsula the name "Soldier Duck" is said to have been given them from their habit of swimming in









MAP 99. Distribution of S  
Breeding range, dotted  
Sporadic records





Eider (*Polysticta stelleri*)

er range, broken line  
by crosses (X)









MAP 99. Distribution of Steller's Eider (*Polysticta stelleri*)

Breeding range, dotted line; winter range, broken line  
Sporadic records indicated by crosses (X)







single file. As if by a given signal, writes Littlejohn (U. S. Biological Survey notes) they all disappear beneath the surface; when they arise they form a solid square, then single file again and repeat.

FLIGHT. "Any one who has heard Steller's Eider flying on a still day must be struck by the astonishing noise made by their wings — a sound similar to that made by the Golden-eyes, but very much louder" (William Percy, *in litt.*). They assemble in huge flocks in the winter and even in summer flocks numbering up to very many hundreds consisting of males or non-breeders, have been seen about July 1. W. S. Brooks (1915) speaks of flocks on the south side of St. Lawrence Island toward the end of June "so massed that no space of water could be seen between them." They have been classed as the swiftest of all the Eiders on the wing.

ASSOCIATION WITH OTHER SPECIES. Dall (1874) speaks of them as associating only with the King Eider on the Aleutian Islands, and Murdoch (1885) made the same observations about Point Barrow. Nelson (1883), however, reports flocks of thousands about Cape Wankarem in August, in company with an equal number of King Eiders and a few Pacific Eiders, passing in and out each evening from a large estuary near the village. In winter on the Pribilofs, W. Palmer (1899) saw them in the company of Harlequins and Bretherton (1896) speaks of them as associating with King Eiders about Kadiak Island in winter.

VOICE. Lord William Percy writes me that the only sound he ever heard from this Eider was a "growling" noise like that made by a female Widgeon. He is under the impression that this note is uttered by the female only. No naturalist seems to have heard or at least recorded any note from the male. It seems probable that the male makes only some low courtship sound.

A good drawing of the male's trachea, by Professor Newton, is reproduced (but incorrectly) in Yarrell (1884-85). Unfortunately no description is given. The trachea itself appears to be uniform in size, with a small simple-looking *bulla ossea* at the lower end, intimately connected with the left bronchus. The bronchi appear to be joined together again by a small bridge not far below their bifurcation, leaving a curious-looking open space.

FOOD. I have been told that about the tundra pools in western Alaska these Eiders sometimes feed by tipping up like a Mallard but of course this is not the usual method. Very few stomachs have been carefully examined. In June W. Palmer (1899) found this Eider in the Pribilofs feeding on small shell-fish, and great quantities of sea-fleas. Murdoch (1885) mentions marine invertebrates, especially gephyrean worms. In stomachs of specimens shot in Norway, Collett (*fide* Naumann, 1896-



1905) found especially mollusks and crustaceans of the following species: *Litorina palliata*, *Lacuna vineta*, *Trophon truncatus*, *Margarita helicina*, *Pleustes panopla*, *Anonyx lagena*, *Podocerus anguipes*, *Baccinum grælandicum*, *Anonyx gularis*, *Margarita grælandica* and species of *Gammarus* and *Amphithoë*.

A couple of well-filled stomachs from the Pribilof Island region showed 60% amphipods and the remainder chiefly univalve mollusks. There were traces of marine worms (*Nereidæ*), barnacles, sea-urchin and algæ (Preble and McAtee, 1923).

The food found in 44 stomachs of Steller's Eiders taken at Lütke Island and St. Lorenz Bay, Siberia, in June and July, was found by the U.S. Biological Survey to be of the same general nature. Water-fleas (*Amphipoda*) among crustaceans, and bivalves among mollusks were the predominating food items. Barnacles also were freely taken, and an occasional marine worm, crab, and sea-urchin. There was only a trace of vegetable matter (algæ) present in the stomachs (W. L. McAtee, MS. notes).

**COURTSHIP AND NESTING.** The male, so Lord William Percy tells me, works his head back and forth while courting, in the manner of the Common Eider, but no note has ever been heard from him.

The breeding season all along the Arctic coast begins in late June and extends over at least the first half of July. In St. Lawrence Bay, William Percy found almost all the females sitting by June 18. At Point Barrow young were seen July 28 (*vide* Cooke, 1906). On the Taimyr peninsula A. T. von Middendorff (1853) found fresh eggs on June 25 and Bunge (1883) took eggs on the Lena delta on July 4. Mr. H. B. Conover (*in litt.*) saw the first young in the Hooper Bay region of western Alaska on July 8. A nest found the same day with the eggs pipped was placed at the edge of a very small pond about a foot or so from the water.

Few Arctic travelers have found these ducks actually nesting, for they fly inland for some distance and scatter over the tundra pools. A. T. von Middendorff (1853) found nests on the Taimyr peninsula on the flat tundra in the moss. The nest is deep and lined with down. William Percy found no nests except on Lütke Island and on the neighboring mainland of St. Lawrence Bay. These had all been robbed by Eskimos. The female is said to be very tame, and to pay much more attention to marauding jaegers than to human intruders.

The clutch, according to A. T. von Middendorff (1853), numbers seven to nine eggs. But an apparently full clutch of only six eggs was taken at Point Barrow and any clutch numbering more than six would seem to be too large for a bird of the Eider group. We know too that the broods are exceedingly small in this species. The eggs resemble those of the Common Eider in color, being pale greenish gray, but they are much smaller. Thirty eggs measured on the average 62.19 by 40.78 mm., the greatest length and breadth being 67.7 and 42.5, the smallest 55.5 by



38 mm. The down from a nest taken at Point Barrow by McIlhenny is very dark brown; almost black, in fact. That collected by Buturlin is described as sooty blackish brown, while the small feathers amongst it are dark grayish at the base but otherwise dark brown.

The incubation period is unknown, nor do we know how long the males stay in the vicinity of the female. Presumably they leave early in the incubation period, for they are seen in large flocks on the coast during the last days of June (as early as June 25) and first days of July. These males, so Lord William Percy tells me, begin to show signs of a change into eclipse plumage about June 25 and most of them are in complete summer (eclipse) plumage by July 19. Mr. H. B. Conover had the same experience around Hooper Bay, Alaska, and writes me that he shot a drake whose head and neck were well into eclipse as early as June 28, 1924.

STATUS. The north coast of Alaska seems to be visited chiefly by non-breeding flocks and in autumn or winter the west coast has large numbers of migrants from farther west or north. On the north coast it is little more than a straggler and sporadic breeder. Its center of abundance is on the Arctic coast of Siberia, west of Bering Strait as far as the Kolyma, where it is undoubtedly the commonest duck in June and July, especially about St. Lawrence Bay. Beyond the Kolyma its relative abundance in the region as far as the Taimyr peninsula is little known. It is reasonable to assume that there must be some large breeding colonies for flocks of non-breeding birds are common as far west as Varanger Fjord.

It certainly is a very abundant nester as far south as Hooper and Igiak Bays in extreme western Alaska. Mr. Conover writes me that at that point it and the Spectacled Eider are even more abundant as breeders than the Common Pacific Eider.

ENEMIES. In western Alaska various gulls, principally the Glaucous and the Glaucous-winged, are very destructive to the young of all the Eiders and even to young geese. Possibly even the Short-billed Gull may be destructive for it has been known to attempt to pick up the downy young of ducks that had been just shot. The jaegers (of three species?) seem to do most harm to the nests of the ducks, both Steller's and Spectacled Eiders. It may be that Snowy Owls occasionally catch young ducks and geese for the latter have been found dead in one of their nests (H. B. Conover, *in litt.*).

FOOD VALUE. The flesh is strong like that of other Eiders.

HUNT. Nelson (1883) gives an excellent description of the primitive methods employed by the natives about Cape Wankarem, who shoot a large number for food. "This village was built upon the spit cutting this estuary from the sea at this place,



and lay directly in the track of flight followed by these Eiders as they passed to or from the sea. As these flocks passed back and forth the birds were being continually brought down by the slings thrown into the midst of passing birds by the natives; yet, notwithstanding this, the birds continued from day to day the entire season to pass and repass this place. Their heedlessness in this respect may be accounted for from the fact that these people were without guns of any kind, and were thus unable to frighten them by the noise of the discharge. The birds were easily called from their course of flight as we repeatedly observed. If a flock should be passing a hundred yards or more to one side, the natives would utter a long, peculiar cry, and the flock would turn instantly to one side and sweep by in a circuit, thus affording the coveted opportunity for bringing down some of their number. These flocks generally contained a mixture of about one-twentieth of the number Pacific Eiders, and the remainder about equally divided of Steller's and the King Eiders. At times the entire community of these birds, which made this vicinity their haunt, would pass out in a solid body, and the flock thus formed exceeded in size anything of the kind I ever witnessed."

**BEHAVIOR IN CAPTIVITY.** This species has never been kept in confinement.

**HYBRIDS.** No hybrids have been recorded.



# SPECTACLED EIDER

*ARCTONETTA FISCHERI* (BRANDT)

(Plates 79, 80, 82)

## SYNONYMY

*Fuligula* (*Lampronetta*) *fischeri* Brandt, Mém. Acad. Imp. Sci., St. Pétersbourg, ser. 6, vol. 6, p. 6, 10, 14, pl. 1, fig. 1-4, 1847.

*Somateria fischeri* G. R. Gray, Genera Birds, app., p. 28, 1849.

*Lampronetta fischeri* G. R. Gray, Proc. Zool. Soc. London, p. 211, pl. 108, 1855.

*Arctonetta fischeri* Baird, Birds No. Amer., p. 803, 1858.

*Anas fischeri* Giebel, Thesaurus Ornith., vol. 1, p. 351, 1872.

## VERNACULAR NAMES

*English:* Spectacled Eider, Fischer's Eider, Blue-eyed Duck, Small Pistrik (Russian).

*German:* Fischers Eiderente, Brillen Eiderente.

*Eskimo:* Ungu, Kawaso, Tutulu, Yukglulu.

## DESCRIPTION

**ADULT MALE:** A circular area around the eye (the "spectacle") white or cream-color, bordered before, behind and above by a velvety-black line. Lores and forehead covered by stiff, plush-like feathers almost white along the edge of the culmen and shading into beautiful olive-green color, which still farther back gives way to a pale buff color, slightly greenish. Crown and occiput light olive green, the feathers lengthened almost into a pendent crest in the latter region. Underneath the eye-patch, and extending back to the nape is a stripe also olive green in color. Chin, throat, neck, mantle, scapulars and falcated tertials white. Back white, shading into a dark gray on the rump, upper tail-coverts and tail; a patch on each side of the rump white. Whole of the lower side from the upper breast to the under tail-coverts and tail very dark uniform plumbeous or smoky gray. Wing with the lesser coverts white and the greater ones, as well as the outer secondaries and all the primaries, dark gray. Inner secondaries or tertials falcated, and pure white; under wing-coverts white.

"Iris bright milky white with a ring of milky blue surrounding it; feet and legs dull olive brown, except the scales in front of the tarsus, which are dingy yellowish; bill dull orange" (Nelson, 1887; Murdoch, 1885).

Wing 255-267 mm.; bill 21-23; tarsus 45-50.

**ADULT FEMALE:** Head and neck buff color finely streaked with blackish on the crown and nape. Around the eyes is a lighter area corresponding to the curious circular white pad seen in the male. The forehead and lores are darker and more brownish than the chin and throat. Whole of the upper side, mantle, back, rump, and upper tail-coverts conspicuously barred with black and rich fulvous brown, almost chestnut in some specimens; tail black. Breast similar to the mantle, but the abdomen nearly uniform dark smoky gray. Sides, flanks and under tail-coverts barred like the breast. Wing-coverts barred nearly like the mantle, except the greater ones which are plain brown, fading to gray



on the tips and outer webs. Secondaries dark brown like the greater coverts and with their tips grayish. Inner secondaries (tertials) slightly falcate. Under wing silvery brown.

"Bill dull blue; feet and tarsi yellowish brown" (Nelson, 1887).

Wing 240-250 mm.; bill 25; tarsus 46.

*Note:* Some females are much darker across the lores and upper forehead than others.

**MALE AND FEMALE IN FIRST (JUVENAL) PLUMAGE:** Most like the female but the whole upper side very much duller and more uniform, without any conspicuous black and brown barring. Feathers of the mantle dull blackish with brownish edges. Back and rump dull black with little or no barring; upper tail-coverts strongly barred. Whole lower side very much lighter colored than in adult female, a dark buffy color, closely marked all over with dark gray transverse bars. Flanks like the abdomen. Head nearly uniform pale buff, darker on the lores, middle of occiput and nape. The area around the eye, the "spectacle," already vaguely indicated by lighter coloring and different feathering.

"Bill dark olive brown; legs and feet dull yellowish, shaded with olive brown" (Nelson, 1887).

**IMMATURE MALE:** I have no juvenal male in early autumn before me, but from specimens of young males taken later on I should judge that the sexes must be almost, if not exactly alike in September and October. It is quite likely that the males can be distinguished from the females early in the autumn by their yellower bills and more prominent "spectacles."

Progress toward maturity in the male is slow, and by the first spring (June) there may only be a few white feathers on the mantle and around the edge of the "spectacle" patch. Some feathers suggesting those of the adult male may appear upon the upper breast and on the sides of the breast and flanks. The rest of the lower side looks exactly as in early autumn (juvenal) only the feathers are faded and much lighter, as they are in the juvenal Scoters. It is very doubtful whether this Eider reaches maturity until its third autumn and winter although I have not examined a very large series. No doubt there is a great variation among individuals in this respect.

**MALE IN ECLIPSE:** A specimen, apparently an adult male, in the Philadelphia Academy of Natural Sciences, taken September 17 at Point Barrow, appears to be in a late eclipse stage. The whole head is almost uniform gray, but lighter in front of the eyes. The area which is green in winter is nearly white, while the "spectacle" patch is not formed of such thick and velvety feathers as in winter. Moreover this patch is dark gray instead of white. The long green feathers on the occiput and nape are replaced by short brown ones. The throat is nearly white. Scapulars gray, not white, but wings nearly as in winter plumage. The breast is a dirty brownish, not smoky black, and the rest of the lower parts are mixed gray and black, the feathers black at the tips only, not uniform black.

**YOUNG IN DOWN (Plate 80):** Uniform pale brown above without any white dorsal spots, being in this respect just like the Scoters and the other Eiders. The pale brown of the upper side blends gradually into the gray or gray-brown of the lower side. On the sides of the face and around the eye the peculiar "spectacle" pattern of the adult is already indicated. There is a large light-colored patch around the eye, a darker patch close to the eye and a fairly well-defined post-orbital streak. The frontal feathering is greatly prolonged on to the bill. These young are easily classified as Eiders by the very greatly prolonged frontal feathering on the culmen which distinguishes them from the Scoters. In the Common and the King Eider the loreal feathering as well as the frontal feathering runs out to a point, making an entirely different feather edge along the sides of the bill. Finally the curious "spectacle" patch is present in the young of no other species of duck.

## DISTRIBUTION

THE range of the Spectacled Eider is similar to that of Steller's Eider but more restricted. As far as we know now the center of its breeding area seems to be the Arctic coast of Siberia, where it nests on





MAP 100. Distribution of Spectacled Eider (*Arctonetta fischeri*)

Breeding and winter range, dotted line  
Sporadic records indicated by crosses (X)







the coast eastward of the Jana River (Buturlin, 1910). It is moderately common on the New Siberian Islands in summer, though few if any breed there (Birulia, 1907). On the mainland it is said to be the commonest breeding Eider between the mouth of the Indigirka and Chaun Bay (Buturlin, 1910) and especially about the mouth of the Kolyma (Buturlin, 1906; Thayer and Bangs, 1914). Eastward it is known as a breeding bird in diminishing numbers as far as Cape Chukski (U.S. Biological Survey), but in any case it must be a very rare nesting bird, for Lord William Percy could not find a nest even after a diligent search.

In America the range of this species is confined entirely to Alaska. L. M. Turner's (1886) statement that it is resident and nests on the Aleutians seems to me very questionable. On the mainland it is known to have bred as far south as the mouth of the Kuskokwim and thence north about Hooper Bay, the delta of the Yukon, at Andreafski, St. Michael's, Nome, Port Clarence, Icy Cape. Point Barrow, Camden Bay and Barter Island (Dall and Bannister, 1869; Nelson, 1887; Murdoch, 1885; W. S. Brooks, 1915; R. M. Anderson, 1917; F. S. Hersey, 1917; U. S. Biological Survey; H. B. Conover, *in litt.*).

Next to nothing is known of the winter habitat of this species. G. D. Hanna (1920) has recorded specimens taken on St. Paul in the Pribilof group in January, 1918. The species winters on Unalaska (Dall, 1873) and the Near Islands (L. M. Turner, 1886). I think it may safely be assumed that all suitable localities in the Aleutian chain are frequented in winter by these birds.

#### MIGRATION

THE migration of a species so local in its distribution is of necessity a very restricted one. There is little information available about its movements and we do not know where the bulk of them winter. It is probable, as Cooke points out, that the Aleutian chain constitutes its winter home. We know that it is so rare as to be practically absent in winter along the south shore of the Alaskan peninsula and the southwestern end of Kadiak Island (C. Littlejohn, U.S. Biological Survey field-catalogue).

It migrates later than the other Eiders, not reaching Point Barrow until the end of May, and it leaves northern regions early. According to William Percy they were still making north in East Siberia well into June. But at Point Dall, extreme western Alaska, they were seen in 1924 as early as May 15 and a week later they were common, so Mr. H. B. Conover writes me. The curious thing about them was that they did not come from the south and pass on to the north but came *from* the north and northwest and headed in to Hooper Bay where they took up their breeding stations.

In spite of late spring migration some begin to nest rather early (June 10) although this is probably exceptional.

#### GENERAL HABITS

WE know so little about this bird, that any general remarks can scarcely be to the point. It has the ear-marks of a disappearing species and without much doubt it will vanish ultimately from Alaskan waters. It may possibly be much more common on little-visited sections of the Asiatic coast than we now realize. The extermination of the large game all along coastal districts in Alaska has thrown an increasing burden upon the birds and the fish. Moreover it is very hard to place regulations upon game where the natives are often really hard put to it for a food supply. Perhaps the reindeer industry, now thriving under the efforts of our Biological Survey, may make it possible ultimately to regulate the killing of moulting geese and ducks and the robbing of their nests in Alaska.

This Eider shows a peculiar preference for salt-marshes bordering the coasts of



Bering Sea, thus favoring shallow, muddy places which are distasteful to Steller's Eider (Nelson, 1887). It is very local in its distribution and may be easily overlooked. It nests always on fresh waters (tundra pools) close to the coast.

WARINESS. Most writers (Dall, 1873; L. M. Turner, 1886; Birulia, 1907) speak of this Eider as a very shy bird and the last-named traveler even found it so on the breeding grounds. But Lord William Percy writes me that on the Arctic coast of eastern Siberia they were the tamest sea ducks he met, becoming a bit wilder in the moulting season, though he adds, "I never had the slightest difficulty in getting almost any specimen I wanted." Presumably those on the Alaskan coasts have learned through continued persecution by the natives to keep out of gun-shot. On the nest the female is more concerned with marauding jaegers and gulls than with wandering human beings. She can be easily photographed on her nest.

DAILY MOVEMENTS. Nothing recorded.

SWIMMING AND DIVING. The only note I have of their activities on the water is in a letter from William Percy, who writes: "I spent a good deal of time watching them feeding, and though they are excellent divers and stay submerged for a great length of time, they are markedly more clumsy than any of the other Eiders, opening their wings before diving and making a perceptible splash in getting under."

FLIGHT. Dall and Bannister (1869) describe the flight as more rapid than that of most ducks, and say these birds usually fly very close to the water. Nelson (1887) saw them flying in small compact flocks, rarely exceeding fifty birds in a flock, and skimming close to the surface of the ice or marsh, with a flight very similar to that of other heavy-bodied sea ducks. Everywhere a rather uncommon species, large flocks are unknown. On the eastern Siberian coast, William Percy writes that on June 23 "a flock of one hundred to a hundred and fifty Eiders passed me in a thick fog. All the birds I could see were Fischer's Eiders and I am under the impression that the whole flock consisted of these birds." He adds that with this one exception he never saw more than fourteen together and rarely more than three or four.

ASSOCIATION WITH OTHER SPECIES. At Point Barrow they are said to arrive in the flocks of King and Pacific Eiders (Murdoch, 1885), but William Percy says (*in litt.*) that in his experience nine out of ten of the Fischer's Eiders he saw were in the company of two or three King Eiders, and never with any other species.

VOICE. All we know of the voice is contained in the remark of Nelson (1887) that he "never heard any note uttered except by the female while conducting her brood out of danger."



FOOD. In summer, says Nelson (1887), their food "consists of small crustacea, grass, seeds, and such other food as the brackish pools afford." We have an insight into their winter food through three specimens taken by native hunters on the Pribilof Islands in January, 1918. These contained amphipods 90%, mollusks about 5% and various minor items such as foraminifera, bryozoans, sea-urchin, sand-dollar, starfish, crab, the bones of a sculpin and bits of kelp. One species of amphipod, *Bathymedon obtusifrons*, was identified (Preble and McAtee, 1923).

A stomach from St. Lorenz Bay and one from Lütke Island, Siberia, contained only remains of a few mollusks (U.S. Biological Survey).

COURTSHIP AND NESTING. The breeding season extends from the first week in June to July. Most of the eggs are laid between the 10th and 20th of June at St. Michael's. Even as late as the middle of August young birds from a few days old to those nearly able to fly, were frequently seen (Nelson, 1887). At Point Barrow, Alaska, a female with a mature egg was taken on June 19 (Murdoch, 1885) and downy young were found on July 28 (Cooke, 1906). In the Hooper Bay region Mr. Conover writes me that he found the first broods on July 8, 1924, and that after that they were common. In Siberia, Buturlin took a clutch of three on the Indigirka on June 28 (Dresser, 1908).

Favoring, as it does, shallow muddy coast waters, it nevertheless seems always to come inland to breed or chooses a pond in the marsh, placing the nest in some dry grassy spot. Dall and Bannister (1869) found a nest in the center of a small pool in the marsh, built on a tussock just above the surface of the water. One reported by Nelson (1887) was on a bed of dry grass within a foot of the water, on the border of a pond. At the mouth of the Kolyma they bred on little lakes in the tundra (Thayer and Bangs, 1914). On the Muxonovka River Birulia (1907) says they breed on the borders of lakes, more rarely on islands in the river and almost always far from the sea. Tussocks of dry grass, small islands in ponds, and knolls close to the water's edge are all chosen as nesting sites, and as a rule the nest is well concealed by the dry grass standing about it (Nelson, 1887).

The clutch numbers from five to eight or nine. In color the eggs are light olive drab. Thirteen eggs averaged 68.44 by 44.78 mm., the maximum length and breadth being 72.1 and 47, the minimum 61 and 43 mm. (Hartert, 1920a). The incubation period is unknown. Before the clutch is complete the female usually flies off when disturbed, says Nelson (1887), and remains until the intruder is gone, but if the set is nearly completed or incubation is begun she will soon return, frequently accompanied by the male, and both circle about showing the greatest uneasiness. In another place Dr. Nelson (1883) says that the male is much more likely to stay with the female during the incubation period than is the Pacific Eider. An instance of extraordinary courage shown by a female in staying with her brood after



they were all shot and she herself had been wounded, is also recounted by the same writer.

The broods seem to be small and in constant danger from gulls of several species, at least Mr. Conover writes me that this was the case in western Alaska. He had a curious experience which throws some light on the early life of the brood. One day he shot a Glaucous Gull which dropped about thirty feet from a mother Spectacled Eider and her young. "She immediately left the young and fluttering over the water approached the dead gull, calling excitedly. At first she seemed a little afraid of the gull but as it did not move she soon gained courage and would make a rush at it, springing into the air and just clearing the gull, while she made a half-hearted peck at it as she passed over to its other side. This was done repeatedly. I shot the other gulls about the pond and the old hen was almost beside herself with excitement, rushing back and forth from one dead gull to another; meanwhile the young had swum off by themselves." Mr. Conover says that the mothers are extremely careful of their young always but in spite of this they were constantly persecuted. Males begin to go into eclipse in late June so Mr. Conover found in the Hooper Bay region.

STATUS. Although about forty or fifty years ago this species was moderately common in western Alaska, particularly about St. Michael's (Dall and Bannister, 1869; Nelson, 1887), it is now by far the rarest of all Arctic ducks in that region, and is apparently rapidly decreasing. Nelson (1887) forecast the special danger to which the species is exposed and recently F. S. Hersey (1917) classed it as very rare at St. Michael's. It is encouraging to get a different report from Hooper Bay, just south of the delta of the Yukon. There Mr. H. B. Conover, collecting during the past summer (1924), found it a really common breeder and equal to Steller's Eider in numbers.

The recent discovery of nesting areas much farther east, on the Siberian coast, where up to the present it has not been exposed to serious persecution (the natives being scarce and poorly supplied with firearms), leads one to hope for its future. Buturlin (1910) goes so far as to say that between Chauna Bay and the Indigirka River it is actually the commonest Eider. Koren (Thayer and Bangs, 1914) found it far from uncommon about the mouth of the Kolyma, and Birulia (1907) says it is a bird well known to the natives of the Arctic coast about the Jana.

Lord William Percy looked very carefully in ponds near the coast along the Arctic shore from St. Lawrence Bay to East Cape in 1914 but he found no evidence of its breeding there. His impression was that the bird was commoner to the north and west. He found that the Eskimo persecuted these birds to some extent, but only the males, and he does not think this a very important factor in East Siberia. He adds in a letter to me, that "it seems probable that the bird was never a very strong species numerically, and always much less gregarious than the other Eiders."





SPECTACLED EIDER  
DRESSER'S EIDER

DOWNY YOUNG

STELLER'S EIDER  
KING EIDER







ENEMIES. In western Alaska large gulls of several species prey on the downy young, apparently Glaucous and Glaucous-winged and possibly smaller gulls also (Short-billed?). Three species of jaegers are found there and all these are constantly on the watch for eggs of this and the other Eiders. The Snowy Owl has been mentioned as a possible source of danger to young birds.

HUNT. Dall and Bannister (1869) state that on Stewart Island the natives killed many with sticks and clubs during the moulting season. The skins were and still are greatly prized as ornaments and they are used for manufacturing caps, mats, etc. The striking scalps are made into decorations of various sorts (Seale, 1898; F. S. Hersey, 1917).

Lord William Percy has a mat in his possession composed of the skins of ten Fischer's Eiders in its center, surrounded by a border of King and Pacific Eider heads.

BEHAVIOR IN CAPTIVITY. This species has never been kept in confinement.

HYBRIDS. No crosses between this and other species have ever been recorded.



## EIDER DUCK

*SOMATERIA MOLLISSIMA* (LINNÉ)

(Plates 71, 80, 81, 82)

### SYNONYMY

*Anas mollissima* Linné, Systema Naturæ, ed. 10, vol. 1, p. 124, 1758.

*Anser septentrionalis* Gerini, Storia degli Uccelli, pl. 162, 1776.

*Anser mollissimus* Bonnaterre, Encyclop. Méthodique, vol. 1, p. 119, pl. 33, fig. 2, 1790.

*Anas cutberti* Pallas (in part), Zoographia Rosso-Asiatica, vol. 2, p. 235, 1811.

*Anser lanuginosus* Leach, Syst. Cat. Mamm. and Birds British Mus., p. 37, 1816.

*Somateria mollissima* Fleming, Philosophy of Zoology, vol. 2, p. 260, 1822.

*Platypus mollissimus* Brehm, Lehrbuch Naturg. Europ. Vögel, p. 809, 1824.

*Somateria danica* Brehm, Oken's Isis, p. 998, 1830.

*Somateria platyuros* Brehm, Oken's Isis, p. 998, 1830.

*Somateria megauros* Brehm, Oken's Isis, p. 998, 1830.

*Somateria islandica* Brehm, Oken's Isis, p. 998, 1830.

*Somateria st. cutberti* Eyton, Cat. British Birds, p. 58, 1836.

*Fuligula mollissima* Selys-Longchamps, Faun. Belg., vol. 1, p. 143, 1842.

*Somateria thulensis* Malmgren, Oefvers. K. Vet.-Akad. Förhandl., p. 380, 1864.

Additional synonymy under Geographical Races.

### VERNACULAR NAMES

*English:* Eider Duck, Common Eider, St. Cuthbert's Duck, Eider Goose, Moss Cock, Moss Ducker, Dunter, Sea Duck, Shoal Duck or Sand-shoal Duck, Wamp, Squam Duck, Black-and-white Coot, Big Sea Duck, Laying Duck, Shoreyer, Eskimo Duck, Canvas-back, Wamps, Gochach (St. Kilda)

*German:* Eider Ente, Eider Gans, Eider Vogel, Eddergans, Ädarvogel, St. Kuthberts Ente.

*French:* Eider, Eider vulgaire, Morillon, Oie à duvet, Grosse ouette, Canard édre-don.

*Italian:* Edredone, Anatra dal piumino, Eider.

*Helgoland:* Hurn-snoabelt.

*Dutch:* Eidereend.

*Esthonian:* Eider-pihle.

*Polish:* Kaczka erdordrenova.

*Hungarian:* Lagy dunna.

*Gaelic:* Lach colonsa, Lach mhor, Colk, Lacha heisgeir.



*Icelandic:* Aedur, Aedarfugl, Aedarblikki, Aedarkella.

*Faroese:* Eava, Aeda, Blikur.

*Danish:* Ederand, Ederfugl, Uhand, Grienlandsön, Nabodoscy.

*Norwegian:* Estegg, Efugl, Edderfugl, Ärfugl, Aer, Aerbolt, Aede.

*Swedish:* Ejder, Ärbult, Helsingbock, Skrya, Gudunge, Ana, Era, Ergus, Knubbgas, Blankare, Plussare, Guding, Skvacka, Agubbe.

*Lapp:* Hauda, Havdda, Akta, Likka.

*Finnish:* Haahka, Hauho, Kalkas, Auhti, Haahkatelkkä, Merisora.

*Russian:* Gagka normota, Gaga, Gafka.

*Czech:* Kahaika obecna.

*Croatian:* Patka gavka, Lagana gavka.

*American Indian:* Morgac, Moyac.

*Japanese:* Kewatagamo.

*Eskimo:* Meetik, Amaulik, Arnaviak, Avok, Malersertak, Ugpatekortok.

## DESCRIPTION

**ADULT MALE:** Top of head deep black divided behind by a white line running forward from the nape; the black extending forward along the upper edge of the loreal feathering. Nape and a part of the side of the neck and face pale olive or emerald green. Most of cheeks and throat and remainder of neck white. Mantle, scapulars and sides of the back and rump white. Middle of back and rump and all of upper tail-coverts and tail black. The white of the throat fades into the pale pink-buff or pink-cream color of the breast (this color fades to dull cream soon after death). Remainder of under surface black; wing-coverts white except the last row of the greater coverts which are brownish black like the secondaries. Primaries dark brown; under wing-coverts brown mixed with white. Inner secondaries slightly falcated.

Iris dark brown. Bill, basal part olive green, shading into gray or bluish gray and with nail much lighter color, yellowish or yellow-brown color. Several writers (Saxby; Le Roi; Robinson; Smalley) speak of the orange-yellow or ochre-yellow color at the base of the bill and it is probable (although I have no exact notes) that the yellow color is commonly present only at the height of the breeding season. However, there seems to be a good deal of local variation in bill and leg coloring in different parts of the range. Legs and feet 'oil green' to light olive green and even to yellowish olive; the webs blackish to pale greenish brown and the claws pale brown.

Wing 269–328 mm.; bill 49–61; tarsus 45–55.

Weight 5 to 5½ pounds (2.26 to 2.49 kilograms); weights over 6 pounds not reliable. According to Schiöler up to 2.353 kilograms.

**ADULT FEMALE:** General coloration rather pale rufous brown to rich, almost chestnut brown (in fresh autumn plumage much darker and richer than at the end of winter or early spring). Head and neck rusty brown, darker on crown and occiput and with sides of head and throat narrowly streaked with black. Whole of the upper side banded with black and rufous brown, except the tail which is black. Breast banded like the mantle but the abdomen down to the vent nearly uniform dark brown. Lower abdomen and under tail-coverts more banded, like the breast. Wing-coverts banded like the back, all except the greater ones which are uniform dark brown like the secondaries; like them also they are tipped with buff forming two buff-colored speculum-bands. Primaries very dark brown. Inner secondaries falcate as in the male.



Iris brown, as in the male. Bill dusky greenish to olive green with the nail horn-color and the yellow at the base of the bill never as lively as in the male. Legs and feet nearly the same as in male.

Wing 266–295 mm.; bill 44–57; tarsus 45–53.

Weight: up to 4 pounds, 14 ounces (2.208 kilograms).

FIRST (OR JUVENAL) PLUMAGE, male and female: Most like adult female but very much paler and grayer and far more uniform in general appearance, lacking the heavy banded pattern characteristic of age. The mantle and scapular feathers are dull brownish or grayish with narrow lighter-colored edges while the lower side is dull gray or brown, not dark blackish brown. The light-colored wing-bars on the greater coverts and outer secondaries are absent while the inner secondaries are uniform blackish and very little falcated.

Wing 250–260 mm.; bill 35–50.

IMMATURE MALE: At first scarcely to be distinguished from the young female although various minor characters are given by writers, some of them of doubtful value. As a rule the head and upper side are darker than in the young female. The young Eider goes through a very long and complicated series of plumage changes which can only be briefly outlined here. These have been well marked out by Schiöler, Millais and others. The main difference between the male Eiders and the males of many other ducks is the extreme slowness of the changing process so that one may distinguish a remarkable succession of plumages, as follows: first winter, first eclipse, second winter and spring, second eclipse, third winter and spring, third eclipse (this last as in adult eclipse). At the same time there is a considerable increase in size which is shown in growth of wings, bill and tarsus as well as in the weight. Thus fully adult stages are certainly never reached until the autumn of the third year, that is at twenty-nine to thirty months of age, and in many cases (perhaps most) not until the third summer (third eclipse) at three years of age.

The first changes make the young male look darker about the head, almost black on the face with a light area through and back of the eye. There is much variation in the amount of white plumage assumed on the upper breast, mantle and scapulars during the first winter. Some birds show scarcely any white feathers up to the end of March or only a few among the long scapulars, upper mantle or upper breast. Others have the whole chin, throat, breast, mantle and scapulars nearly pure white, but with of course the juvenal abdomen. I have seen a specimen taken at the end of January which has the sides of the head nearly white and a green tinge appearing on the lores and nuchal areas, the breast white with the pink tinge and most of the mantle and scapulars white, while the tail-feathers, all except the three outer pairs, had been renewed. Black feathers soon invade the sides and flanks and the tail may or may not be renewed before spring. The first-eclipse birds can be told from later eclipses by the retained juvenal feathers (lower parts) and the juvenal wing.

During this second winter the male looks a good deal like an adult and can be told at a glance from all first-winter birds by the presence of conspicuous white patches on either side of the rump. There are signs of immaturity about the head and neck and on the mantle and scapulars, as well as the back and rump, while the inner secondaries never have so much white as in the adult, nor are they so falcate in shape. There is more brown in the lesser wing-coverts and those along the edge of the wing than in fully adult birds. By spring of this second year the young male is nearly like the adult except for the signs of immaturity in the wing.

The second-eclipse plumage is very nearly the same as that of the adult but the brown innermost secondaries are more or less marked with white and the median coverts blackish (tipped) and the lesser coverts brown.

In the third winter, as soon as the second-eclipse feathers are moulted out, that is not until November or December, the young male is almost in complete adult dress, but the white innermost secondaries have brownish tips (Witherby) while some inner, greater and median coverts are mottled





|        |            |            |      |  |
|--------|------------|------------|------|--|
|        | KING EIDER |            |      |  |
| Female |            | Male       |      |  |
|        |            | EIDER DUCK |      |  |
|        | Female     |            | Male |  |







brownish. The back and rump are said to look more like second-winter birds than like fully matured birds, but I cannot vouch for this on my own observations. It is quite safe, however, to take the opinions of those who have studied Schiöler's enormous collection in Copenhagen that males (all?) do not reach complete maturity until the third eclipse.

**IMMATURE FEMALE:** During the first winter the young female gets new adult-looking barred plumage on the upper side, the first new feathers appearing among the scapulars. By spring she looks nearly like the adult female, but has no white wing-bars. Even during her second winter the white tips to the secondaries and greater coverts are narrow so that we can say that full plumage is not reached until the second eclipse, at two years of age.

**ADULT MALE ECLIPSE:** Moults begins soon after the first of July. The head and neck, except for a streak of whitish feathers through the eye, are dark brown. The mantle and scapulars dark sooty brown, sometimes with a small admixture of white feathers. The back is as in winter but the sides of the rump and the upper tail-coverts are brown, with few or no white feathers. The whole breast becomes sooty brown like the head, while the rest of the lower parts is nearly as in winter. The wing is the same as in winter. This plumage is often partly retained until rather late in the autumn (November) and possibly later. Doubtless old specimens come into winter plumage sooner than one-, two-, and three-year olds.

**DOWNY YOUNG:** This is dark dull brown all over the upper side and like the Scoters lacks all the white or whitish dorsal spotting seen in so many ducks. The top of the head, like the rump and back, is nearly black. The dark color of the upper side merges gradually with the dingy gray of the throat and abdomen.

Iris dark brown. Bill and feet, except the nail which is yellowish, dark blue-gray.

## DISTRIBUTION

THE Eider Duck, together with its various races or subspecies, is practically circumpolar in its distribution, breeding on the coasts of north temperate and arctic countries and wintering on the coasts of the former (see end of the account of the species for geographical races).

### BREEDING RANGE

IN Iceland, where the birds are rigorously protected, they breed on all the coasts in very considerable numbers (Slater, 1901; Hantzsch, 1905; *et al.*). The same is true of the Faroes (H. C. Müller, 1869) and of the Shetlands (Saxby, 1874; A. H. Evans and Buckley, 1899). In Scotland it has been known as a nesting species from the early Middle Ages but, due to protection, it has greatly increased and extended its breeding range since the middle of the nineteenth century. It now nests regularly on the Orkneys, Outer Hebrides, Inner Hebrides, and locally on the coasts of Wigtownshire, Argyll, Inverness, Ross and Sutherland. On the east coast it is less common, but nests are regularly found along the entire coast, particularly on the islands of the Firth of Forth (G. R. Gray, 1871; Millais, 1913; and especially Baxter and Rintoul, 1922, and W. Evans, 1923). In England the species breeds only in a few localities on the Northumberland coast, on the Farne Islands and on Holy Island (Millais, 1913; Witherby *et al.*, 1919-22; Bolam, 1912), while in Ireland it has only very recently been found nesting on a small island off the Donegal coast (H. W. Robinson, 1912; Stoney, 1923).

On the Continent the Eider has recently been discovered breeding on a small island off the southern coast of Brittany (C. Ingram, 1912a; Plocq, 1913). This is the southernmost breeding record for Europe. Small numbers nest on the islands of Vlieland and Terschelling off the Dutch coast (Leege, 1910; van Oort, 1922). There are no breeding records for the German

Northern  
Europe

Holland



mainland, but regular colonies of nesting birds have for years been established on the North Friesian Islands off the coast of Schleswig, especially on Sylt (Naumann, 1896-1905; Hagendefeldt, 1906; Dietrich, 1910; Reichenow, 1920a; etc.); also on Manö and Fanö (E. L. Schiöler, *in litt.*).  
**Denmark** Small numbers also nest on the islands of the west Danish coast (Kjärbölling, 1850) as well as on those in the Skaggerak (Olsen, 1907) and the Kattegat. A few pairs, so I am told by Mr. Schiöler, nest at Saltholm in Oresund.

On the coasts of the Baltic the Eider is far less common as a breeding bird. There are no nesting records for the German Baltic coast, though the species breeds regularly in small numbers on the  
**Baltic** coasts of Latvia and Esthonia and on the island of Oesel (Grevé, 1908; Loudon, 1909).  
**Coast** Occasional specimens are seen in the summer in the Gulf of Finland even about Petrograd and Viborg (Palmén, 1876; Bianchi, 1907). A few breed about Helsingfors (Palmgren, 1913) while on the southwest coast of Finland, especially on the Åland Islands, it is an abundant nesting bird (von Nordmann, 1864; Palmén, 1876). Varying numbers nest on both sides of the Bothnian Gulf and along the southern and western coasts of Sweden (Nilsson, 1858), as well as on the southern coast of Norway. The great nesting area, however, is on the Norwegian coast north of Trondhjem, upon the Lofotens, and clear up to Varanger Fjord (Collett, 1873; Schaanning, 1913; etc.).

East of Varanger Fjord and the Norwegian boundary the numbers of breeding Eiders rapidly decrease, due perhaps to persecution. On the Murman coast they are still fairly common  
**Northern** crease, due perhaps to persecution. On the Murman coast they are still fairly common  
**Europe** (Witherby, 1900; Bianchi, 1902b; H. J. Pearson, 1904), but comparatively few nest on the coast of the White Sea, in the Gulf of Onega and about Shishgin Light (Seebohm, 1882a; E. von Middendorff, 1891).

In the Arctic the Eider has been found nesting commonly on Jan Meyen (F. Fischer and von Pelzeln, 1886; Oustalet, 1894) and on Bear Island (Swenander, 1900). On Spitzbergen it is by far  
**Spitz-** the commonest breeding duck north even to Ross Land. About all the explorers who  
**bergen** have visited the archipelago dilate upon its abundance (*e.g.* von Nordenskiöld, 1882; A. Walter, 1890; Oustalet, 1894; Römer and Schaudinn, 1900; Bianchi, 1902b; Zedlitz, 1911; Mathey-Dupraz, 1912; van Oordt, 1921; Jourdain, 1922). In Franz Josef Land it seems to occur chiefly if not exclusively in the southern parts, where it has been found breeding (A. Walter, 1890; Bruce and Clarke, 1899; Schalow, 1905). On Nova Zembla it is moderately common as a nesting bird (Spörer, 1867; von Heuglin, 1872; von Nordenskiöld, 1882; Oustalet, 1894; H. J. Pearson, 1899; Molčanov, 1908). On Kolguev it has been found by Stritkov (*fide* Schalow, 1905) and on Waigats it is a fairly common breeder (H. J. Pearson, 1899).

Presumably small numbers of Eiders nest along the Arctic coast of Russia, though there is no reliable evidence for this conjecture. Nor do we know how far east the range extends along  
**Arctic** the Siberian coast. Von Nordenskiöld (1882) speaks of seeing some on the west coast  
**Europe** of the Yalmal peninsula and in the Gulf of the Jenesei, and Popham (1897) reports  
**Asia** having seen the species on the lowest reaches of the Jenesei.

In the extreme northeastern part of Siberia the Eider is represented by the Pacific subspecies (*S. m. v-nigrum*). Whether the two races merge is not yet determined. Buturlin (1908), to be sure, gives the Lena delta as part of its habitat, but American explorers never met with it west of the Ajon Islands or even Cape Irkaipiz (Thayer and Bangs, 1914; Riley, 1918). East of Cape Wankarem as far as Bering Strait it is very common (Thayer and Bangs, 1914) and has been found also at Indian Point and Novo Marinsk (J. A. Allen, 1905). On the Commander Islands it is a regular nesting bird in small numbers (Stejneger, 1885; Bianchi, 1909; Hartert, 1920a).

Throughout the Aleutian chain the Pacific Eider is a common nesting species (L. M.  
**Aleutian** Turner, 1886; Nelson, 1887; A. H. Clark, 1910; Bent, 1912; Wetmore, U.S. Biological  
**Islands** Survey). The southernmost limit of the breeding area on the Alaskan coast is not yet  
**Alaska** definitely known. Bailey (MS.) states that the species is seen rarely in Glacier Bay in June. These may, of course, be immature, non-breeding birds. The notes of the United States Bio-



logical Survey give Kachemak Bay, Kadiak Island and Seldovia as the southernmost-known breeding localities. On Kadiak Island large numbers nest (Bretherton, 1896). North of the Alaska peninsula the Eider breeds at all suitable localities along the coast as well as on the islands of the Bering Sea (L. M. Turner, 1886; Nelson, 1887; E. Adams, 1878; Dall and Bannister, 1869; U.S. Biological Survey; etc.). It is very common about Point Barrow (Nelson, 1887; Seale, 1898) and breeds eastward along the coast as far as the Coppermine River and Coronation Gulf (R. MacFarlane, 1908; R. M. Anderson, 1915, 1917). Somewhere in this vicinity the Pacific Eider is replaced by another subspecies, the common Northern Eider (*Somateria m. borealis*). The latter is common all along the arctic coasts and on the coasts of the arctic islands of North America. It has been met with along the coasts of Banks Land and Prince Albert Land, on Prince of Wales Land, the Parry Islands, in Wellington Channel, on Beechey Island, at Port Bowen, in Bellot Strait, on Melville Peninsula, in Repulse Bay and south on the coasts of Hudson Bay to York Factory (R. M. Arctic Anderson, MS.; Low, 1906; Payne, 1887; Preble, 1902; U.S. Biological Survey). In Archipelago the Far North the species has been observed in King Oscar Land (U.S. Biological Survey) and as far as Grinnell Land and even Grant Land, in latitude 82°-83° north (Greely, 1886; Coppinger, *vide* Schalow, 1905; Feilden, 1908).

On the Greenland coasts the species is everywhere known as a breeding bird. On the west coast it has been found all the way from Bessels Bay and Dumb-bell Bay south to Narsak (U.S. Biological Survey; Chamberlain, 1889; W. Stone, 1895; Vanhöffen, 1897; F. M. Chapman, 1899), Greenland while on the east coast it has been recorded from Angmagsalik (Helms, 1904) north to Scoresby Sound, Shannon Island and King William's Land (Vanhöffen, 1897; Manniche, 1910; U.S. Biological Survey). On the west side of Baffin Bay the Eider was found common and breeding in Cumberland Gulf (Kumlien, 1879) and on Resolution Island (Hantzsch, 1914).

On the coasts of Labrador the Eider is everywhere a common breeder. It has been observed on the west coast of Hudson Bay as far south as York Factory (Preble, 1902; Bell, *vide* J. and J. M. Macoun, 1909). No doubt it is rare or entirely absent on the barren coast south of York Factory, Labrador but on the rocky east coast of James Bay and Hudson Bay, and on the numerous islands which dot the coast it is everywhere an abundant nesting bird from just north of Moose Factory to Hudson Strait (Spreadborough, *vide* J. and J. M. Macoun, 1909). The same is true of the coasts of Hudson Strait and Ungava Bay (Packard, 1891; Hantzsch, 1908; C. W. Townsend and Allen, 1907) and thence south along the east coast of Labrador (C. W. Townsend and Allen, 1907; J. and J. M. Macoun, 1909; Beetz and Townsend, 1916). South of Hamilton Inlet the American Eider (*Somateria m. dresseri*) is the common nesting bird along the northern shore of the Gulf of St. Lawrence, especially on the Mingan Islands (Schmitt, 1904; Cooke, 1906; Beetz and Townsend, 1916). They nest also on the coasts of Newfoundland (Reeks, *vide* J. and J. M. Macoun, 1909; Millais, Newfoundland 1913) and the Museum of Comparative Zoölogy has young in down from the Magdalen Islands. A few nest on the coasts of New Brunswick (islands outside Grand Bay of Manan), along the entire coast of Nova Scotia (formerly) and on the islands of the Bay Fundy of Fundy (Downs, 1888; Tufts, *vide* J. and J. M. Macoun, 1909; Piers, *in litt.*). It is now much reduced in Nova Scotia but a few pairs were found breeding in 1920 at Seal Island off the southern end and at Isle Haut in the Basin of Minas. The southernmost limit of the breeding area is on the coast of Maine where very small numbers still nest on the islands of Penobscot and Jericho Bays (O. W. Knight, 1908; U.S. Biological Survey), and on Old Man Island near Eastport. From most of this region it is now extirpated as a breeding species.

#### WINTER RANGE

THE winter range of the Eider is not easy to define. As a rule Eiders may be found north wherever there is open water and sufficient food, no matter how high the latitude. In Europe Europe great numbers winter on the coasts of Iceland (Slater, 1901; Hantzsch, 1905), on the



Faroes (H. C. Müller, 1869) and the Shetlands (Saxby, 1874; A. H. Evans and Buckley, 1899). On the west and south coasts of Great Britain the species is not common in winter, but on the east coast, especially north of Northumberland, it is quite abundant and regular (Witherby *et al.*, 1919-22; Millais, 1913; etc.). On the coasts of Ireland it is everywhere uncommon, only some forty or fifty instances of capture, most of them on the northeast coast, having been recorded (Ussher and Warren, 1900; Patten, 1915).

On the Continent the Eider winters all along the coasts of the Scandinavian peninsula (Wallengren, 1854; Nilsson, 1858; Collett, 1873; Schaanning, 1913). Indeed, specimens have been seen on Amsterdam Island in the Spitzbergen group in winter (Pike, 1898) and others pass the cold season on the coasts of the White Sea (Seebohm, 1882a; E. von Middendorff, 1891). On the Baltic coasts of Germany and on both coasts of Denmark great numbers winter (Naumann, 1896-1905; Kjärbölling, 1850; Reichenow, 1920a; etc.), but on the Dutch coasts only small numbers are seen (van Oort, 1922) and on the Belgian coast it can hardly be called more than a straggler (Dubois, 1886). Small numbers are occasionally seen on the northern and western coasts of France (Ternier and Masse, 1907; Paris, 1907).

Immature birds are from time to time shot or seen far inland and far south in winter. Specimens have been taken in almost every one of the German States (Naumann, 1896-1905) and there are two records of its occurrence in Poland (Taczanowski, 1888). In the territories which Germany formerly comprised the Austro-Hungarian Monarchy specimens have been recorded from Bohemia (Fritsch, 1872), Styria, Tyrol, lower Austria, northern Hungary, Bosnia and Dalmatia, about fourteen instances in all (von Mojsisovics, 1886; Reiser, 1895; von Biedermann, 1897). Females and young birds have not uncommonly been taken on the Swiss lakes (Fatio, 1904) and in various parts of France, such as Alsace (Sartorius, 1895), Picardy (d'Aubusson, 1911), France Maine (Rogeron, 1903) and Vienne (Ternier and Masse, 1907). On one occasion an immature was taken on San Miguel in the Azores (Hartert and Ogilvie-Grant, 1905). So far as I know there are no records of the Eider appearing on the coasts of Spain or Portugal, but on the coasts of the Mediterranean, especially about the delta of the Rhone, females and young birds are not a great rarity (Mingaud, 1906; l'Hermitte, 1916). There are also a number of records from Italy, ranging from Trieste, Venice, Lombardy, Liguria, Tuscany and Emilia south to Apulia (Giglioli, 1886; Arrigoni degli Oddi, 1904; Balducci, 1913). It may be mentioned that Parrot (1905) believes he saw an Eider in the Gulf of Messenia, Greece, in March. This, if authentic, would constitute the southernmost winter record in Europe.

In regard to the wintering area of the Eider in Asia practically nothing is known. Thayer and Bangs (1914) recorded the species on the Diomed Islands in Bering Strait during the winter months and Bianchi (1909) states that it winters on the Commander Islands. Un- Arctic Coasts doubtedly it is to be found in suitable localities along the coasts of the mainland and of Kamchatka, perhaps also on the Kuriles.

On the American islands of Bering Sea, that is, on the Aleutians, the Pribilofs and smaller groups, the Eider is a common wintering bird, as it is also on the coasts of the Alaskan mainland (Dall, 1874; L. M. Turner, 1886; Nelson, 1887; W. Palmer, 1899; etc.). The southern limit of the regular wintering range on the Pacific coast is entirely unknown, but those seen about Tacoma, Washington (J. H. Bowles, 1906), were merely stragglers.

As in Europe so in North America, females and young are occasionally taken on inland waters. There are records of its occurrence at Fort Providence and Fort Resolution in the Great Slave Lake region (Preble, 1908) and specimens have been taken on Lake Manitoba (A. Brooks; United States Interior Taverner, *in litt.*). There is a doubtful record for Montana (Cameron, 1907) and one for Colorado (W. L. Sclater, 1912). There is another from South Dakota (Visser, 1912) and one from Kansas (Snow, 1892). R. M. Anderson (1907) states that it is 'rare' in Iowa. About the Great Lakes it is somewhat more common. There are about three records from Wisconsin (Kum-









MAP 101. Distribution of Ei  
Breeding range, dotted line; south





duck (*Somateria mollissima*)

limit of winter range, broken line









MAP 101. Distribution of Eider Duck (*Somateria mollissima*)

Breeding range, dotted line; southern limit of winter range, broken line







lien and Hollister, 1903), one or two from the vicinity of Chicago (Woodruff, 1907) and about a dozen from Michigan (Barrows, 1912). It has occurred once in Ohio (L. Jones, 1903).

On the Atlantic coasts the Eider winters as far north as the southern coasts of Greenland (Hagerup, 1891) and Baffin Land (Hantzsch, 1914). Perhaps a few spend the winter months along the east coast of Labrador where currents keep the water open. On the coasts of Newfoundland and Atlantic along the shores of the Gulf of St. Lawrence it is everywhere a regular visitor as far up Coast the river as Quebec (Dionne, 1906; U.S. Biological Survey). Southward it is common (mostly the subspecies *dresseri*) along the coasts of Nova Scotia, Maine and Massachusetts and as far as the Rhode Island coast (G. M. Allen, 1909; O. W. Knight, 1908; etc.), but beyond Long Island Sound it becomes increasingly rare, though specimens are taken from time to time on the coast of New Jersey (W. Stone, 1909), Delaware (Rhoads and Pennock, 1905) and Maryland (Kirkwood, 1895). The southernmost record is for Cobb Island, Virginia (Bigelow, 1901).

#### MIGRATION

ON our Atlantic coast we know very little about the southern wintering grounds of the true Northern Eider (*Somateria m. borealis*). All we know is that it is only a casual visitor as far south as Massachusetts and we must presume that the great wintering grounds are much farther north, probably not south of the Gulf of St. Lawrence. They leave their far-northern breeding grounds, although many winter in Greenland and some at least as far north as Cumberland Sound, in September, October and November, the males usually ahead of most of the females and late-hatched young (Greely, 1886; etc.). Dresser's Eider (*Somateria m. dresseri*) reaches Massachusetts points from the Gulf regions between the 4th and 25th of October. In the B. P. Clark records at Cohasset, Massachusetts, there are two or three mid-September records (earliest September 12, 1871) but the main flight is much later, middle to late November. They leave New England waters in late April, a few remaining till May, and appear in the Gulf of St. Lawrence soon after. The usual time of arrival along the south shore of Labrador (Piashte Bay) is between April 15 and June 15. In arriving from the south they pass the west end of Anticosti and strike the north shore at the Mingan Islands, those not remaining passing east along the whole north shore, and out of the Straits of Belle Isle. The autumn migration is just the reverse.

Another well-marked phenomenon is the summer movement of males, probably those which have bred, flying east along the same shore in late June and July when all the males between Godbout and Chateau Bay seem to leave for the east coast of Labrador (Beetz and Townsend, 1916; C. W. Townsend, *in litt.*).

As a counterpart of the above, a general movement of males of the Pacific Eider is seen going west on the Arctic coast of Alaska and Canada after July 2 (W. S. Brooks, 1915; Stefánsson, 1913), no doubt headed for some definite summering or moulting ground where they may cast their wing-feathers without fear of being frozen in during late summer and early autumn.

The Pacific Eider arrives at the mouth of the Yukon the last of April or early May but on the north coast of Alaska a good deal later, not reaching Demarcation Point until about the 26th of May. They fly east all along the coast, many stopping to rest, across Franklin Bay between Victoria Island and the mainland and into Coronation Gulf.

Along this bleak coast some females and young remain in the few spots of open water until late October but most of them leave the whole region by early October going west around Alaska. In the more temperate parts of Alaska it seems likely that many individuals are nearly sedentary.

To return to the Northern Eider, these arrive in Hudson Strait and on southern Baffin Land shores from middle to late April. Hantzsch (1914) found that a few remained all winter in 1909 at Cumberland Sound but the last usually leave by November 6. Kumlien (1879) noticed long ago that old males left this same region much earlier than females and young. Late broods unable to fly are common in all northern regions and a few always get caught in the ice. Kumlien also found one wintering



in this region in the tide rifts of the Greater Kingwah River in January with the thermometer at  $-50^{\circ}$  F.!

In western and northern Europe open oceans and temperate climates have resulted in a tendency to sedentary groups. Such occur in the Faroes and most likely in Iceland and in Scandinavia. The few which breed in Scotland, England and the North Friesian Islands apparently do not even move far from their regular homes. Sporadic migrations, usually of immature birds, do take place to points farther south in some winters.

Most likely those which nest far east on the north coast of Russia have a very definite west-and-east, east-and-west migration, but we have not been told about this.

### GENERAL HABITS

It would be difficult to say which were the better-known duck, the present species or the all-pervading Mallard. I do know that only a substantial monograph would be sufficient to deal with the plumage changes, the life-history, the interesting but often unnatural stories which have been passed down about the Eider, to say nothing of the historical associations and the industries which have grown out of the gathering of its down and feathers. Remember, too, that Eiders of one race or another flourish all around the polar seas with the possible exception of a gap in northern Siberia and Arctic America, that they furnish food and clothing to American Indians, Eskimos of nobody knows how many different tribes, Icelanders, Scandinavians, Chukchis and many others. Forget not that half a hundred northern explorers have written chapter after chapter on this interesting duck, that numerous travelers to Iceland in the last two centuries have given accounts of the semi-domestic colonies where the famous down is gathered, and that the bird was connected with the legends surrounding St. Cuthbert who lived on the Farne Islands in the seventh century! With this wealth of material to choose from it is hard to compress this account into anything like a reasonable space.

"They build themselves Nests on the Rocks," said John Ray in 1678, "and lay good store of very savoury and well-tasted Eggs; for the getting of which the neighbouring people let themselves down dangerously enough, and with the same labour gather the feathers (Eider dun our People call them) which are very soft, and fit to stuff Beds and Quilts."

The Eiders share with the Long-tailed Duck the honor of being the most northern breeding and wintering of the whole duck tribe. The Common Eider, with its various races considered here as one (see under Geographical Races), is a creature of ice-choked and storm-swept coasts, oblivious to wind and weather so long as open water and a supply of common mussels or other shell-fish, crustaceans and even sea-urchins and starfish exist at moderate depths. It will stand a temperature of fifty or sixty degrees below zero, better apparently than the balmy coasts of temperate regions favored by warm ocean currents.

The male, says Langille in words which remind one pleasantly of an older style,



"is a very ideal of chaste beauty, the darkness of the deep beneath him, the snow of the mountain above him, the ice beneath his crown, and the rosy tint of the aurora borealis on his breast, he is the symbol of our most intensely startling and beautiful ideas of the north." In full plumage these birds cannot well be confused with any other duck save possibly with the King Eider from which the male is easily picked out by his whiter wing-shoulder. The King Eider has a black wing with a white patch. But so many curious plumage stages are found in one- and two-year old Eiders, that immatures cannot be distinguished with certainty.

The female, too, is difficult. The large size, rich chocolate color and straight bill-to-forehead line proclaim her an Eider, but she cannot be easily distinguished from the female King Eider (see under King Eider).

Eiders are more wedded to the sea than any of the duck tribe. All of the others, even Scoters, Long-tails and Harlequins, resort to far-inland fresh waters to breed, and cut across thousands of miles of inland country. Not so with the sea-born Eiders, who travel an immense distance around land masses, such as Alaska and East Siberia, in order to reach their summer destinations. It is true here and there they will follow a few miles up a river in order to reach some inland bay or island-studded lake, particularly well adapted for safe nesting, but such localities are always, so far as I know, within short over-water flights of the open sea, perhaps never over fifteen or twenty miles.

WARINESS. Although not so confiding as some other sea ducks, Eiders are naturally tame and never really wild. Under suitable conditions it is rather easy to obtain shots at them under sail, for their slowness at getting under way and their lack of judgment of the speed of your approach renders them easy victims. Their greatest protection is the boisterous nature of their off-shore haunts and the unerring instinct with which they avoid cutting close in to land, except during a gale when they are at times drifted over low sand-points or rocky headlands in their morning and evening flights.

They are not especially keen on reacting to sounds, such as gun-shots, and in migration they are often shot from "cooting" boats, coming up to decoys anchored near an unconcealed boat. A remarkable instance of their powers of observation was quoted by Mackay (1890). The keeper of a light at the end of a breakwater on Nantucket told him that a flock of feeding Eiders undoubtedly perceived a difference if the lantern was not in place at the top of an iron rod. If he did not want to have any shooting done there, all he had to do was to leave the lantern half-way down the rod instead of at the top. Under these conditions no ducks could be induced to come near the jetty.

On the breeding grounds Eiders, even if continually pestered by eggers, show very little fear of man. They are probably much more concerned with selecting sites safe



from their great enemy, the Arctic fox. As soon as they approach land with the object of nesting they become much tamer even than during winter. Their nests are not carefully hidden and the females sit exceedingly close, becoming almost like barnyard ducks as incubation advances.

Later on, when the males retire to some safe spot on the coast to moult (often after a considerable migration), they get so extremely wary that they can only be approached under very exceptional conditions. A team of boats can of course surround and tire out a body of such birds in a calm sea, but the male at such times is entirely conscious of his helplessness and acts accordingly. While the males of the surface-feeders seek the densest covers, he trusts to the open ocean.

**DAILY MOVEMENTS.** It is doubtful whether Eiders ever feed at night during autumn and winter. Probably their very regular habits are altered during the Arctic summer days, just as our own are when we are first introduced into a 24-hour daylight. I remember that when our party landed in Greenland in July, 1896, we soon found ourselves traveling or working all night, dining early in the morning and perhaps sleeping at noon, so that we lost all track of meals and meal-time.

As we see them in winter they are the most regular of sea ducks in their morning and evening flights, always so far as I know "going to roost" on the open ocean over deep water, often many miles from their feeding shoals. These flights take place regardless of weather conditions and are the same in all parts of the world. They return in the morning, about as soon as daylight comes, flying in from the open sea or broad waters, around islands or beaches to mussel-banks, often far up in bays. Even when their feeding grounds are well off-shore they seem to leave them at night. It is possible that in places a great many roost on rocks at night; such habits have been noticed. In summer they spend more time on land.

**GAIT AND SWIMMING.** Eiders, unlike Scoters, are very partial to perching on rocks or beaches and where unmolested they resort to any places that are not much disturbed. They also "haul out" on ice a good deal. If they are only a few yards from water they make a run toward it and get into their favorite element before taking to wing. They can, of course, fly off the land; the female has to when flushed from her nest, but it is not their favorite procedure. In late winter and early spring they come more to land, especially in fine weather, but some few seem to resort to sand-bars even in December.

The swimming posture is not unlike that of the other sea ducks. The head is kept drawn in and the tail lies low upon the water.

**DIVING.** Inhabiting the same sort of winter ground as Scoters, they probably do not feed at much greater depths. Ten to twenty feet might be considered as the



ordinary depth and twenty-five or thirty-five feet the maximum. Indeed, some writers (A. Chapman, 1889; etc.) have put three fathoms as about their limit. Others, like Naumann, Holböll and Faber, placed their capacity as high as fourteen to even fifty meters but such statements are certainly absurd.

As to the time under water no scientific observations have been made. The statement of Holböll (1846) that the average dive is two to three minutes and that in one case the bird stayed submerged six minutes, is, of course, exaggerated. It seems doubtful that they can remain under much more than a minute.

There is no question but that Eiders use their wings under water, whether or not they are wounded. Observations to this effect were made on captive birds in shallow ponds (St. Quintin, 1899), and with others under natural conditions. Notes on the use of wings in crippled birds, as I have said more than once, are never reliable. The Eider uses its wings just as does the Harlequin, held close to the sides and beaten with short jerks, not extended as in aërial flight.

This duck does not always try to escape by flying, but when suddenly alarmed the diving instinct may take precedence and he may vanish for an instant and then take wing out of harm's way. He also occasionally dives from the wing when fired upon (A. C. Chapman, 1887; Murdoch, 1885), although I do not remember ever seeing this myself. It is a very frequent trick of the Harlequins.

"The flock often vanishes," says Millais (1913), "for several minutes, and, even when they appear amidst the worst breakers, they possess so sure an instinct of where it is possible to float with safety that a few strokes backwards or forwards with their powerful paddles is sufficient to place them in such a position that they are not overwhelmed. Unlike their neighbours, the Long-tailed Ducks, who have a habit of just sliding through a breaker to the other side as it is about to fall upon them, Eiders dive again at once in search of food, as if it were a waste of time to bother about temporary comfort."

**FLIGHT.** The steady, unwavering Scoter-like flight, now very close to the water, now a few feet above it, is very characteristic. Small groups like to fly in chains or lines, one behind the other. In autumn migration flocks are of almost any size from family groups up to a hundred or more but usually they are small. In the spring very large numbers gather together, both on the water and in the air and flights numbering many thousands are not uncommon. Mr. W. S. Brooks tells me that he has seen Pacific Eiders on the north of Siberia flying in a continuous flock, almost without a break for forty-eight hours, so many birds that he was afraid even to estimate their numbers; "but there were not less than three hundred per minute."

In winter the daily journeys are usually made by small lots breaking away from large aggregations, for when "on feed" Eiders scatter a good deal. Very large flocks in the air at one time are rare on the wintering grounds, although bodies of several



thousand were mentioned in southern Greenland by Holböll (1846) and Mackay (1890) saw many thousand together in one place near Muskeget Island, Massachusetts. It is evident that the northern journeys must be made in much larger formations than the southern ones.

ASSOCIATION WITH OTHER SPECIES. Eiders are truly gregarious ducks and like plenty of company. They are often found more or less closely associated with other common sea ducks, and the King Eider especially is almost everywhere found in their flocks. On the Atlantic coast Eiders occupy the same waters as Long-tailed Ducks and the three Scoters, the Loons and Mergansers.

On the breeding grounds they habitually nest in colonies and in many localities the nests are so thickly packed that several females often lay in one nest. On occasion a female will even lay in the nest of some other bird. In eastern Finmark an Eider Duck's egg was found in the nest of a Herring Gull by Wolley (A. Newton, 1907), and MacMillan (1918) says that in Greenland he often found Eider eggs in the nests of Brant or even in the nests of the Glaucous Gull.

On the other hand eggs of other birds have at times been found in nests of the Eider. Von Nordenskiöld (1882) reports having found eggs of the Barnacle Goose in the nest of an Eider in Spitzbergen. There is a case on record of a nest in Argyll, Scotland, containing five Eider and four Red-breasted Merganser eggs surrounded by Eider down, while just outside the nest were two more Merganser eggs (Rogers, London Field, July 3, 1920).

VOICE. The voice of the male Eider is one of the most remarkable of all duck notes, more or less resembling in quality that of the Long-tailed Duck. This "love-note," as C. W. Townsend (1910) says, "can be expressed by the syllables *aah-ou* or *ah-ee-ou*, frequently repeated, and, while low and pleasing in tone, its volume is so great that it can be heard at a considerable distance over the water. On a calm day, when there were many Eiders about, the sound was almost constant. While the syllables *aah-ou* express very well the usual notes, there is much variation in tone from a low and gentle pleading to a loud and confident assertion. In fact the tones vary much, as do those of the human voice, and there is a very human quality in them, so much so that when alone on some solitary isle, I was not infrequently startled with the idea that there were men near at hand."

These dove-like calls are not entirely reserved for the spring, but are often heard in mid-winter or even in autumn. I do not believe, as Millais (1913) suggests, that the male has another note, a hoarse grating, like *kor-er-kor-korr-kor*.

The female's note is heard both on the water and when on the wing. It is entirely different from that of the male, but resembles the cry of other sea ducks. It has been variously rendered by the syllables *ka-ka-kah-kah* or *kar-kar-er-karkar-kaa*.



The trachea of the male, first described and figured by Sabine (1819), is nine inches or a little more in length and of uniform diameter. At the bifurcation of the trachea there is a "transversely oblong dilatation, projecting more towards the left side, one inch in breadth and one-half inch in length" (Audubon). The principal peculiarity is the enlarged or swollen region in the upper part of the left bronchus. The right bronchus is also somewhat dilated and both taper off before entering the lung.

Food. The winter food of the Eider is similar to that of the Scoters; if anything it is coarser, that is, larger objects are taken. In most places Eiders are almost dependent on mussel-banks, while sea-clams, scallops, razor-fish and snails are important items. They seem to pick up more crabs than other sea ducks do and do not even stop at such coarse and prickly diet as sea-urchins and starfishes. Fish are taken only exceptionally, although fish-spawn has been found in stomachs and they are said to eat the remnants of fish cast overboard by the fishermen, and Hantzsch (1905) says they even devoured the waste from the birds which he prepared. The vegetable food, at least of our Atlantic coast birds, is unimportant.

A series of forty-four stomachs from the Pribilof Islands (*S. m. v-nigrum*) taken from January to March and examined by W. L. McAtee of the U.S. Biological Survey, shows the true proportions of the diet. Mollusks were 41.2%; crustaceans 28.2%; sea-urchins 9.45%; starfishes 7.34%; and algæ 7.47%. The mollusks included limpets, sea snails, mussels and sea slugs. Among the crustaceans there were no less than 13.06% of crabs; 12% of amphipods and a little more than 1% each of shrimps and isopods. Less important articles were barnacles, worms, hydroids, bryozoans, sea-spiders, ascidians and a few minute protozoans (foraminifera). Probably most of the vegetable material is taken by chance, that is, incidental to the capture of a variety of small animals on the kelp beds (Preble and McAtee, 1923).

To give an idea of the extraordinary size of the creatures the Eider manages to swallow it may be worth mentioning razor-fish eight to ten inches long (H. W. Robinson, 1909; Millais, 1913), crabs up to at least two inches in diameter (Saxby, 1874), to say nothing of the claws of even larger crabs, and snails of various species up to two inches in length (Rey, 1910). Mussels up to two or even two and a half inches are evidently taken (Naumann) and one of the largest was found by Mackay (1890) attached to the base of the tongue of an Eider in such a way as to hold the bill partly open. The bird was emaciated and standing helpless on the beach. Although in most cases shell-fish are swallowed whole and ground up in the very muscular gizzard, Mackay (1890) noticed that with sweetmeats (*Crepidula fornicata*) they "shuffled" the meat out and left great quantities of the discarded shells lying on the feeding shoals.

The enormous amount of animal food necessary to keep such a large bird alive is brought out by the numbers of shells sometimes found in a single stomach. As many



as 550 of a small species of bivalve have been taken at one time from a Pacific Eider (*S. m. v-nigrum*) and with our common Eider (*S. m. dresseri*) 114 of the ordinary blue mussel.

It is scarcely necessary to enumerate the many species of bivalve and univalve shells that have been taken from Eiders' stomachs. Some of the more unusual items of diet were mentioned a good while ago; namely, marine worms (Hagendefeldt, 1906), amphipods (Holböll, 1846), the young of a cottoid fish (*Cottus scorpius*) (Kumlien, 1879) and the spawn of sculpins (Mackay, 1890).

**COURTSHIP AND NESTING.** The display, accompanied by the soft and impressive note uttered by the male, may sometimes be seen in a modified form in mid-winter, or, indeed, in October (Baxter and Rintoul, 1917). The male frequently exhibits his black abdomen by rising up in front so that, as C. W. Townsend (1910) says, he almost stands upon his tail. "To further relieve his feelings he throws back his head and occasionally flaps his wings. The movements of the head and neck are an important part of the courtship, and although there is considerable variation in the order and the extent of the performance, a complete antic is somewhat as follows: the head is drawn rigidly down, the bill resting upon the breast; the head is then raised up until the bill points vertically upwards, and at this time the bill may or may not be opened to emit the love-notes. Directly after this the head is occasionally jerked backwards a short distance, still rigidly, and then returned to its normal position." The duck, swimming near by, is often completely indifferent, but at times faces the ardent male with a slight imitation of the head- and neck-movements. Although not so spectacular as the display of the Golden-eye or of the Goosander, the activity of a flock of Eiders in the courting season is a beautiful scene to witness.

For so northern a breeder the season is notably early. In many arctic regions the nesting grounds are reached before the sea-ice has left the coast. In the North Friesian Islands (Sylt), where, of course, the species is practically local, the average date of arrival is the last day of February and by the end of March a great many are assembled on the breeding places (Hagendefeldt, 1910).

In the southernmost breeding areas the laying season is remarkably early. We have Schiöler's (1908-14) statement that in Denmark he has seen young on May 18, 20 and 23, and there is said to be in the Copenhagen Museum a duckling taken on April 19, 1892. In the Farne Islands the laying season begins about May 12 and lasts through June into July (Millais, 1913). Schiöler (1908-14) gives June 1 as the average hatching time for Norway and Sweden. In the northern parts of the peninsula it is probably a month later, as the first week in June is given as the date of laying by Collett (in Dresser, 1871-81). In Spitzbergen eggs are found throughout June (Bianchi, 1902c; Schalow, 1905), but many are hatched during the same



month, at least in favorable years (Schalow, 1905; Munsterhjelm, 1911). In Iceland, where the nesting season extends over a long period owing to the systematic removal of the eggs, it begins in the middle or end of May (Hantzsch, 1905). In northwestern Greenland (Melville Bay) the birds appeared on June 6 and fresh eggs were found on June 20 (L. Gibson, 1922), but in northeastern Greenland the season is later even than this (Manniche, 1910).

In southern Baffin Land, Hantzsch (1914) found the first large flocks arriving as early as April 18, and on April 28 he found an egg dropped on the snow. Along the north shore of the Gulf of St. Lawrence some of the nesting birds seem to arrive as early as April, but eggs are not found before early June and the height of the laying season is in the middle of June (Audubon, 1860; C. W. Townsend and Allen, 1907). No doubt the nesting season in Maine is, or rather was (for only a few pairs breed there now), as early as May. Audubon mentions finding a couple of eggs on May 31.

On the west coast of Hudson Bay Preble's (1902) observations show that eggs may be found in late April or early May, which is an early period for any bird in such an inclement region. On the north coast of Alaska fresh eggs are found in the middle and last part of June (W. S. Brooks, 1915) and on the west coast not before the first of June (E. Adams, 1878; Nelson, 1887; A. H. Clark, 1910). They seem to nest along the whole Arctic coast, even to far east of the MacKenzie delta at about the same time.

The nesting colonies are usually on small islands or rocky promontories of the coast, but it is not uncommon for them to resort to bogs or tundra lakes some few miles back from the coast. They prefer such places as they can reach by flying up connecting waterways. In the interior of Big Island, on the north shore of Hudson Strait, I saw Eiders coming from a breeding island-studded lake some distance from the coast, following the course of a small rocky river. L. M. Turner (MS.) mentions a colony eighteen miles up the Koksoak River, Ungava. In Iceland a few straggle inland to nest on the fresh-water ponds, but colonies are especially numerous about the mouths of rivers.

Although rocky situations are preferred, colonies have been established on sandy links. In Scotland the birds from such a colony were driven from the links to the adjacent woods, in the shelter of which eighty nests were found (Balfour, 1914). Heather-covered hills are resorted to in that country also. High, flat-topped islands are not infrequently chosen. On Lyra Skerry, Scotland, there was a colony of forty Eiders nesting at an altitude of 180 feet (Raeburn, 1892), and on Grimsey, off the north coast of Iceland, they nest regularly on a plateau 300 feet in height (Hantzsch, 1905). F. M. Chapman (1899) mentions a nest in western Greenland at a height of 450 feet and three-fourths of a mile from the nearest water; and H. C. Müller (1869) says that on Hestö in the Faroes, Eiders nest at an elevation of 1000-1200 feet, though they are said to have to walk up to the nests!



The nest is placed in such a variety of situations that there is nothing characteristic about it. Often on bare mossy plateaus, it is just as likely to be concealed between rocks or tussocks or scrub firs or willows. In some places, as for example on Old Man Island near Cutler, Maine, they are hidden in such dense vegetation on the narrow terraces of the island that it is scarcely possible to find one.

The nest itself is usually very bulky and is composed of sea-weed, mosses and dried vegetation. In some cases, where vegetable matter is scarce, the duck merely scrapes a hole and lines it with down.

It is rather strange that the clutch should be small, for with most northern-breeding ducks the eggs are numerous. Although the size of the clutch varies in different parts of the world it seems to be quite constant in any given locality. Four, five or six eggs constitute a normal clutch and any clutch of more than seven is probably the work of two or more females. Nesting, as they so often do, in crowded colonies, it is not unusual for two or even three females to lay in the same nest and sometimes even to incubate together. Many writers from widely divergent parts of the range have recorded exceptional clutches, varying all the way from eight to nineteen eggs, the last quoted from the Farne Islands (Bolam, 1912, p. 406).

In many places four is given constantly as the number of the complete clutch. The effect of egg- and down-robbing will be mentioned under the section on this industry.

The eggs are pale olive green, greenish gray, occasionally bright greenish and, in the case of one set from Iceland (Jourdain, 1913), bright blue like those of a Glossy Ibis. They measure about 77.9 by 52.2 mm. (average of 426 eggs). A collection of sixty from the British Isles averaged 76.26 by 51.0 mm. and sixteen from Iceland averaged 76.04 by 49.22 mm. The eggs of the smallest race of Eiders (*Somateria m. faeroeensis* from the Faroes) appear to be as large as or even larger than those of the typical form. Fourteen of these measure 78.85 by 51.89 on the average. A collection of eleven eggs from Greenland averages 75.83 by 50.1 mm., while seventy from Baffin Land average 75.7 by 49.9 (Hesse, 1915a). Eggs of the Pacific Eider average only 72.46 by 48.6 mm. according to Hartert (1920a) but seventy-two in the U.S. National Museum which were kindly measured for me, averaged longer, 73.5 in length. This is remarkably small for so large a series. It would be useless to give the extreme measurements of the eggs, as they vary greatly, even in the same nest. L. M. Turner (MS.) speaks of finding a clutch of six eggs, of which five were normal and the sixth "scarcely larger than that of a robin." He says he has found other eggs hardly as large as a medium-sized egg of the common hen. Hantzsch (1905) also remarks the frequency of dwarf eggs, which he says are especially common early in the season. The down, so important in commerce, is abundant and is a brownish gray or "mouse" gray with lighter centers. It is scarcely likely that the down of the Pacific Eider is consistently different, as maintained by Bunyard (1917), for down characters are rarely constant.



A study of the size of eggs, as affected by latitude, seasonal weather and salinity of the surrounding waters was made by Goebel (1903).

After she begins to incubate the female ordinarily does not leave the nest at all. The layer of fat which she is said to accumulate especially for this purpose seems to carry her through the entire period without either food or water. This may be an adaptation to nesting in very exposed situations, constantly under the eyes of the large northern gulls and other enemies. It is certainly different from the habit of other ducks.

The incubation period was fixed at twenty-eight days by Brünniche (1763), and this seems to be the average. W. Evans (1891) hatched them in twenty-eight days under a hen and in twenty-seven days in an incubator. St. Quintin (1899) and Blaauw (1901) found that the period was regularly twenty-eight days in captivity. References to somewhat longer periods are probably incorrect or exceptional, possibly due to bad weather or "stale" eggs.

The old beliefs had it that when startled from her nest the female deposited an oily and very bad-smelling substance upon her eggs as a protection against foxes, who were said not to touch them, at least until the material became dry. Dr. C. W. Townsend tells me that he cannot agree with Beetz and others about this, that the substance deposited by the female is the usual excrement and that, as it very often does not hit the eggs at all, it cannot play any special protective rôle.

It has often been remarked that males stay about the nesting places during incubation in those colonies where the ducks are so tame as to be semi-domestic. Stories of the more gallant sex aiding the female in various ways are frequent but these must always be taken "with a grain of salt." It is true that in the search for the nest-site the male flies along close behind his mate, but that he actually assists in the construction as E. Adams (1878) asserted is rather doubtful. Kumlien (1879) indeed noticed some males making clumsy attempts at incubating, sitting on the wrong nest for this purpose, only to be driven away by an irate female. Such behavior would, I should guess, be abnormal and due to some disturbance of sex functions. Römer and Schaudinn (1900) twice found males incubating in Spitzbergen.

It should be mentioned that so far as we know males are not completely fertile until their third year (34 months) although it is possible that some may breed (perhaps a good many) at two years old. Females probably breed at two years (Schiöler, 1908-14; Millais, 1913; Beetz and Townsend, 1916).

It is the rule for the father of the family to leave his mate just as soon as she begins to sit. In the Far North, where it would be exceedingly dangerous for him to moult his wings late in the summer, a flight of these males seems to take place in July toward some favorite moulting and feeding ground. Sometimes the wings are not cast until late in the summer, although late July and early August is the usual season.



The young are often led directly to the sea as soon as they are a day old and they begin immediately to dive, though not deeply at first. As many nests are on terraces above cliffs or jagged rocks it has been supposed that the mother carries her young down but wherever actually observed, she either coaxes them down or actually pushes them off (Bedford, 1911; Lee, 1896). It is a common sight to see one mother with several broods, which are, at least temporarily, deserted by their own mothers. Millais (1913) made some observations which seemed to show that the absent females rejoined their own broods. These communistic family arrangements are fully as well marked in the Mergansers.

Late broods are common among Eiders, especially where early nests have been robbed by man or animal enemies. Even where not disturbed there are certain seasons when the arctic regions suffer such unusual weather conditions that the ducks get no snow-free places to nest in until July. Thus it happens that a good many broods yet unable to fly, are frozen in during September or October, deserted by the females, and left to perish in the ice or provide a meal for foxes (Kumlien, 1879; Manniche, 1910; etc.).

The females and young leave the breeding grounds, especially the far-northern areas, much later than the old males, but they must overtake and pick up those happy bachelors somewhere *en route*.

THE EIDER AND ITS DOWN. The practice of the Norwegians and Icelanders of protecting the Eider and exploiting it for the eggs and down goes back many centuries and has attracted the attention of writers from the earliest times. Indeed, St. Cuthbert (died 688), the famous Saxon churchman, is reputed to have befriended the bird on the Farne Islands, where his monastery of Lindisfarne was situated, and where the species to this day nests in considerable numbers. To be sure, no mention of the Eider in connection with St. Cuthbert is made by the contemporary chronicle nor, so far as I know, by Bede in his account of the Saint's life. But in the second half of the twelfth century, Reginald of Coldingham in his "Libellus de admirandis beati Cuthberti Virtutibus" says that the Eider is known as St. Cuthbert's Duck and that the Saint protected them on their nesting grounds, and that they trusted in him.

He tells the story of Aelric, the Hermit, whose servant, Leving, killed and ate an Eider in the absence of his master. St. Cuthbert appeared to Leving and rebuked him in no uncertain terms for having slain one of his own birds. The records of Durham Cathedral show that in 1380-81 twelve pence were paid to a painter from Newcastle "for painting one of the birds of St. Cuthbert, as a specimen for the altar screen," and a list of the furniture belonging to the Feretory of St. Cuthbert, dating from the years 1417-18, mentions "two pairs of pillows, of which one is of 'Cuthbert downe.'" When St. Cuthbert's tomb was opened in 1827 it contained



among other things a robe of silk ornamented with figures of Eider Ducks. But this robe probably dates from the year 1104, or later (see James Raine: *Saint Cuthbert*, Durham, 1828, pp. 22, note, 119, 142, 194–196; the robe is figured on plate 5; cf. also Archbishop Eyre: *The History of St. Cuthbert*, ed. 3, London, 1887, p. 46–47).

It does not appear from these early accounts whether Cuthbert or any of his successors actually cultivated the Eider for its down, though it seems likely enough. At any rate Wormius (*Historia Rerum Rariorum*, p. 310–311, 1655) already speaks of the exploitation of the Eider for its down on the Faroe Islands and the earliest travelers to Iceland, beginning at least with John Anderson (*Nachrichten von Island, Grönland und der Strasse Davis*, 1746), Niels Horrebow (*Tilforladelige Efterretninger om Island*, 1752), and von Troil (*Letters on Iceland*, 1780), all gave full descriptions of the methods employed by the natives. In Iceland, and in fact in all the Danish possessions, the Eider has been protected at least since 1702, when a rigorous royal ordinance was promulgated, the penalty for killing an Eider being the loss of liberty. Others followed in 1733 and 1787. According to Naumann the species has been protected on the North Friesian Islands for at least 250 years, though it is hard to see how they could have been protected there, except by special ordinance, any earlier than in other Danish possessions. In Norway the Danish regulations were evidently not effectively enforced, excepting on a few islands, for Pontopiddan (*Versuch einer natürlichen Historie von Norwegen*, 1753) admits that the Eiders are killed in order to get the down. More stringent ordinances giving general protection were passed for Norway about the middle of the last century. According to Feddersen (1890) protection on the Faroes had not yet been actually enforced by the Danish Government.

In no part of the world has the cultivation of the Eider been so long and so scientifically carried on as in Iceland. Feddersen (1890), the most recent authority on this interesting subject, is of the opinion that the very earliest Norwegian colonists knew the use of the down and the value of the eggs. R. F. Burton (*Ultima Thule, or a Summer in Iceland*, 1875) says that in the fifteenth and sixteenth centuries English merchants carried on trade in eiderdown with Iceland. This was all uncleaned down. Not until the early seventeenth century was a method of cleaning invented in Iceland and not until the eighteenth century was the export of cleaned down the usual thing. In 1787 rigorous laws were passed against netting and shooting and prizes were offered for the best suggestions as to means for protecting the birds. The Governor, Olaf Stephensen, in 1784, published a set of instructions, and from about that time the industry became firmly established (Feddersen, 1890).

An excellent description of how new nesting colonies are started in Iceland is given by Feddersen (1890) based on his own observations and on the instructions in a manual by E. Gudmundson (*Um Aedarvårp*, 1877). In the first place a suitable locality, preferably a rocky point or island, must be chosen. If a point, it must be



fenced off to keep out animals of all sorts. The land must be high and protected from flooding by the sea and the fencing should be sufficiently far from the birds so that they do not see vermin prowling about outside. Nesting places should be provided and should be as sheltered as possible. Those made of turf fixed up like little houses and covered with a stone or a plank are best. The open side should be made to face the sea. Open nests may be made on level ground by digging hollows under the turf and then re-covering them. The owner, in order to attract the birds, gives the new locality the appearance of having been previously occupied. Sometimes old egg-shells are placed in the new nests, and in any case care is taken to remove the snow and put dry grass in the nesting places. Bushes or mere branches are set up to provide cover, and frequently ornaments, such as ravens' feathers, sea-gulls' feathers, colored cloth, mussel-shells and sea-weed are put up to attract the birds. Scraps of iron dangling with shells in the wind have also been found effective, and even a certain type of bell, rung by the action of running water is used successfully. Male decoys made of rubber, wood or tin are placed near by in the sea to attract the females. At first the birds are timid, and, indeed, some spots, no matter how attractive, are habitually scorned.

Under the scrupulous protection it enjoys in Iceland the Eider naturally becomes very tame. Writing of the northwest peninsula of Iceland, C. W. Shepard (quoted by Baird, Brewer and Ridgway, 1884) says: "We landed on a rocky, wave-worn shore. It was the most wonderful ornithological sight conceivable. The Ducks and their nests were everywhere. Great Brown Ducks sat upon their nests in masses, and at every step started from under our feet. It was with difficulty that we avoided treading on some of the nests. On the coast of the opposite shore was a wall built of large stones, just above the high-water level, about three feet in height, and of considerable thickness. At the bottom, on both sides of it, alternate stones had been left out, so as to form a series of square compartments for the ducks to nest in. Almost every compartment was occupied, and as we walked along the shore, a long line of ducks flew out, one after the other. The surface of the water also was perfectly white with drakes, who welcomed their brown wives with loud and clamorous cooing. The house itself was a marvel. The earthen walls that surrounded it and the window embrasures were occupied by Ducks. On the ground the house was fringed with Ducks. On the turf slopes of its roof we could see Ducks, and a Duck sat on the door-scraper. The grassy banks had been cut into square patches, about eighteen inches having been removed, and each hollow had been filled with Ducks. A wind-mill was infested, and so were all the outhouses, mounds, rocks and crevices. The Ducks were everywhere. Many were so tame that we could stroke them on their nests; and the good lady told us that there was scarcely a Duck on the island that would not allow her to take its eggs without flight or fear." Other travelers have also spoken of nests on the roofs and Sir George MacKenzie (*Travels in Iceland*,



1811) speaks of nests in the inside of the houses and in the chapel. The birds are so carefully guarded that no gun may be fired or dog bark in the vicinity of the nests.

A comparison of the oldest 18th-century accounts with those of recent writers will show that there is little if any difference between the methods employed centuries ago and those approved at present. The eggs of the first and second clutches are removed and either eaten as a delicacy or else preserved for the winter by salting them down or by pickling them in skimmed milk. The eggs of the second clutch rarely exceed three in number and those of the third rarely two and usually only one. If the third clutch, too, is taken, it is said that the birds will not return in the following year. On the other hand when well treated they rapidly multiply and return to the same place indefinitely. Eggert Olafsen (*Reise igjennem Island*, 1772) speaks of a pair that nested in the same locality for twenty years. Schiöler (1908-14) quotes Faber that they live to an age of forty years!

Much more important than the eggs is the famous eiderdown. The Icelanders usually remove the down from the first two nests and leave the down of the third nest until the female is through incubating. It would be impossible to mention all the myths that grew up in connection with the practice. Horribow (*op. cit.*) was told that some people put a stick upright in the nest and that the female continues laying until the pile of eggs has covered the stick so that she can sit upon it! He also states that the male plucks some of his down to line the third nest; and maintains further that the down from the dead bird is greasy and easily rots, whence it is very inferior to that from the nest. Saxby (1874) proved to his own satisfaction that there is no foundation for this assertion, and found that even dealers could not distinguish between the two kinds. To mention merely one more legend: It was formerly asserted that to lie upon eiderdown would make a person prone to epilepsy and an old physician, Theodore Bartholinus, took special care to contradict this (Brünniche, 1763).

The Icelanders distinguish two kinds of down, *thang-duun* (sea-weed down) and *gras-duun* (grass down) according to the material of the nest. The method of cleansing, regularly employed since about 1775, is well described by von Troil (*Letters on Iceland*, 1780): "Some yarn is stretched in a square compartment round a hoop, on which the down is laid. A pointed piece of wood is then moved backwards and forwards on the lower side of the yarn, thus stroking, which causes the coarser feathers to fall through, while the fine down remains on the yarn." Other authors have described the same process with slight modifications. Annandale (*The Faroes and Iceland*, 1906) tells of oblong wooden frames, either fixed or held in the hand, over which strings of twine or thongs of leather are rather loosely stretched. "The down is cast on to these near one end, and a spatula of wood or bone drawn briskly backwards and forwards over the other end. The down still clings to the strings, but all impurities, such as pieces of seaweed or grass, small stones, or coarse feathers, fall



through to the ground." The amount of down from one nest appears to be very variable. When the eggs are not taken the female probably furnishes no more than one-half an ounce of clean down. The supply from three clutches is somewhere in the vicinity of one ounce, probably a trifle over.

The export of down from Iceland has varied considerably in the last two centuries. In 1734 clean down was exported to the extent of 172 pounds, while no less than 6000 pounds of the unclean were sent (Feddersen, 1890). In 1750 the total export was only about 1500–2000 pounds (von Troil, *op. cit.*) and in 1760 the clean, and the unclean totalled only 200–300 pounds and 1500–2000 pounds respectively (Brünniche, 1763). The figures given by Feddersen (1890) from Pontopiddan (Samlinger til Handels Magazin for Island, 1787) for the years 1764–83 appear about the same. From 1764–73 the clean amounted to 2128 pounds and the unclean to 13,373. Then came the introduction of cleansing methods, and from 1774–83 the clean amounted to 16,951 pounds and the unclean to only 4846 pounds. After that, very little uncleaned down was exported. The figures for 1847, 1848, 1849 are 2195, 2891 and 3588 pounds, respectively. Then came a great slump, due perhaps to the drop in price about the middle of the last century (to eight Kroner or \$2.25 the pound), but this was over in the 1870's, when it became fashionable in England and France to adorn petticoats with down. The price rose in 1874 to 24 Kroner (\$6.75) and the production soon reached unheard-of heights. The average export from 1876–87 was 6836 pounds annually, and in 1888 and 1889 it was 7500 pounds and 7800 pounds respectively (Feddersen, 1890). Since that time the amount produced has decreased somewhat. In 1902 it was only 5908 pounds (Hantzsch, 1905). In general it may be said that 6000–7000 pounds per annum is the possibility for Iceland at the present time.

There is no evidence that the Danish protective measures have ever been taken seriously by the Greenlanders. The birds are there regularly persecuted by the Danish-Eskimo half-breeds. There is, to be sure, no indication of an alarming decrease in numbers on the west coast of Greenland. Sverdrup (1904) says that in Jones Sound he found evidences that the Eskimos had built small stone houses for the Eiders, but there has never been any real cultivation by the very improvident natives so far as I know. The eggs are collected and eaten in great numbers by the Eskimos and in Baffin Land Hantzsch (1914) found that the natives used the down as towels. In southern Greenland the down is collected from wild nests by the Danes who also pickle the eggs. The export of down is naturally smaller than in Iceland. Figures given by Feddersen (1890) show that the highest mark was reached in 1881–82 when 2613 pounds were exported. After that date the amount gradually diminished and in 1896 only 653 pounds were exported (Winge, 1899).

Next to Iceland Norway is the most extensive down-producing country. An early description of the breeding of the Eider on the Scandinavian coasts is given by



Bishop Pontopiddan (*Versuch einer natürlichen Historie von Norwegen*, 1753), who, in addition to furnishing interesting data, regales the reader with less trustworthy stories. Among other things he says that if the eggs are robbed the female is punished by the male, who beats her with his wings!

It seems likely that the Eider was cultivated on certain Norwegian islands from very early times. Scholars have found that in the beginning of their history the Danes bedded their dead on eiderdown (Feddersen: *Samlinger til jydske Hist. og Topogr.*, vol. 2, p. 17, 1868; Worsaae: *Aarbøger f. Nordisk Oldkyndighed*, p. 207, 1869). At any rate it seems likely that the Norwegians practiced eider-keeping before Iceland was settled. There are a number of islands on the northwest coast of Norway where conditions are identical with those in Iceland. Stejneger (*Riverside Nat. Hist.*) says: "The inhabitants take great care of the breeding birds, which often enter their houses to find suitable nesting-places, and cases are authenticated in which the poor fisherman vacated his bed in order not to disturb the female Eider, which had selected it as a quiet corner wherein to raise her young. In another place the cooking of a family had to be done in a temporary kitchen as a fanciful bird had taken up her abode in the fireplace." L. Lloyd (1867) also speaks of their nesting "not only in the boathouses, but in the very huts of the fishermen." It is of course difficult to give any figures as to the production of down in a country where much is consumed at home. Feddersen (1890) estimates the total production at about 3000–4000 pounds.

Eiders are regularly protected on the North Friesian Islands, where they nest even in the corn- and potato-fields. Hagendefeldt (1906) mentioned a nest found in the wheat-fields and made of manure and dry grass. There are no figures to show the amount of down collected, and the same is true of the Farne Islands, the Scottish coast and the Faroes.

**STATUS.** Originally the most numerous of arctic ducks, Eiders have been greatly reduced in many regions, especially in New England, southern Labrador, Greenland and Spitzbergen. But vast regions remain virtually unchanged.

In the British Isles, although perhaps greatly reduced a long time ago, "the population seems to have remained fairly stationary until the second half of the nineteenth century, in which an enormous increase in numbers took place" (Baxter and Rintoul, 1922). This increase was directly due to protection and resulted in the west and north, where suitable breeding places were plenty, in a great expansion and extension of range, which is still in progress. It was not known to breed in Ireland until 1912 (Donegal, see Stoney, 1923) and there is only a small colony there now. The Wild Birds Protection Act in England in 1880 was an added stimulus to their increase.

In the North Friesian Islands, where it has been protected (under Danish law)



since 1702 it seems, even in recent years, to be becoming more numerous. This is especially true of the Islands of Röm and Sylt. On the latter thirty thousand eggs are taken annually (Möbius, 1870). On the Danish isles they have so far as we know held their own. Certain Fugel-Vass or preserved islands off the northwest coast of Norway have been carefully protected, at least in the breeding season, for a long time, but protection in Scandinavia as a whole was not effective in spite of existing laws until about 1860.

Spitzbergen has been a great egg- and down-gathering country since the middle of the nineteenth century when "nests were so thick that one could hardly keep from stepping on eggs" (von Nordenskiöld, 1882). The duck has never been subject to protection there and has decreased very much in recent years, although still enormously plentiful (N. H. Dole, 1922). The greatest breeding grounds were said to be the Dune Islands in Horn Sound, Advent Bay, Cape Boheman and Nottingham Bay. In 1913 around 2451 kilograms of uncleaned down were brought in to Tromsö from Spitzbergen (Spitzbergen Handb., 1916, p. 25). Ships with 15,000 Eider eggs are said to be still returning from Spitzbergen (van Oordt, 1921). Under these conditions it must ultimately grow much scarcer. In many parts of Spitzbergen Eiders are now no longer found.

In Iceland the Eider is said to have decreased until the fifties, or at least the production of down was low at that time. But after that a great increase in down marketed came, so that by 1887 it had risen to 6200 pounds, in 1884 to 7800 pounds. If we think of twenty nests as giving about a pound of cleaned down, this represents the contents of 156,000 nests! According to Feddersen this represented about 140,000 females.

Greenland has never, so far as I know, been effectively subjected to protective law, and it is remarkable that the species holds out so well, for the west coast is thickly populated up as far as Upernavik. Not only are eggs and down taken, but Eiders are shot and speared for their flesh and skins at any season of year. One hundred to two hundred pounds were brought in to Upernavik in 1850 to 1860 annually (Sverdrup, 1904). According to Feddersen Greenland down as a whole decreased from 2197 Danish pounds in 1878-79 to 1470 in 1887-88 and to 1000 in 1889-90. When I was in the Umanak region in 1896 still greater reduction had been noticed. I could not see evidence of any attempt to safeguard the Eider. Their colonies are of course mostly on outlying islands and one does not see much of them up in the fjords. Doubtless a good many of the islands are hard to land on.

North of Danish influence the Eider is unmolested, save for the occasional visits of arctic expeditions and the pathetic remnant of the Peary Eskimos. The whaling days are over. At Sofia Bay, von Nordenskiöld (1886, p. 170) took 1447 eggs in a short time. Mrs. Peary in her Arctic Journal records collecting forty-three pounds of down in five hours and 960 eggs at the same time.



On our Atlantic coast there is little doubt that a great reduction has taken place in the American or Dresser's Eider (*Somateria m. dresseri*) ever since cod-fishing became an important industry in New England. A few pair, perhaps fifteen or twenty, still nest on certain islands in Jericho Bay in Maine and on Old Man Island, near Cutler. We know little or nothing about the former distribution and numbers in that State except that it was a plentiful breeder there in Audubon's time judging from what he says about Grand Manan. Even in 1871 and 1872 Herrick (1873) found it still breeding in abundance there although fast decreasing, due to the "depredations of the islanders." The earlier author speaks of the great duck-drives of moulting birds in the Bay of Fundy region in his day, which may have consisted largely of Eiders.

It is said to breed now in only one or two places along the coast of Nova Scotia and New Brunswick and to be extremely scarce in Newfoundland. The first place where it is really common as a breeder is on the Mingan Islands and eastward along the north shore of the Gulf of St. Lawrence. It has always been subject to persecution there by the Indians and later by roving fishermen from New England, Newfoundland and other places. In Audubon's day it was common as far west as Partridge Bay. Frazar (1887) called attention to the lessened number of breeding birds about Eskimo Point and Dr. C. W. Townsend has recently (1914) made efforts toward bettering their condition in southern Labrador.

However much they have been reduced since Colonial times this American Eider is far from extinct. It still holds out in goodly numbers; at least several thousand winter about Nantucket, and its numbers there have not changed much in the past twenty-five years. In a letter to Rod and Gun in Canada (September, 1922) Mr. Bonnycastle Dale recorded a flight of 250,000 (the majority of course American Eiders) going south outside Cape Sable, Nova Scotia, in 1921. In the spring of 1922 we are told by Mr. Harrison F. Lewis, chief Federal Migratory Bird Officer for Ontario and Quebec, that in that season they arrived all along the north shore of the Gulf of St. Lawrence in their usual numbers, but owing to a great invasion of Arctic foxes very few reared broods. From this cause and the very bad weather of June, almost none bred; he counted only fifteen broods the whole season. This is of general interest for it shows how certain seasons may be disastrous to northern-breeding ducks. The autumn of 1922 was marked among sportsmen for the scarcity of young Brant, Scoters and Black Ducks.

Mr. Lewis thinks there is no doubt the Eiders are seeking the mainland now more than they used to for breeding and that the species is in no present danger of extermination in southern Labrador.

On the east coast of Labrador the large summer population of fishermen have no doubt greatly reduced the numbers of the American and Northern races of the Eider, but in Hudson Bay, Hudson Strait and Baffin Land, natives are too few to make any very serious drain upon them.



The Pacific Eider (*Somateria m. v-nigrum*) stays both summer and winter in a region so far removed from observers that it is hard to get a clear idea of its status. All we know from arctic expeditions and from various bird collectors is that it goes through Bering Strait in prodigious numbers and proceeds both east and west. My friend, W. S. Brooks, has told me of flights he saw off Cape Serdze, eastern Siberia, that could not have been less than in the millions for they passed that point in a constant flock without a break for forty-eight hours day and night (some may have been King Eiders).

ENEMIES. In spite of its very numerous enemies and the small clutches of eggs, Eiders are able to keep up their numbers. The "unnatural" enemies are man and his weapons, not forgetting floating oil which is a rather serious factor about New England waters and also in western Europe.

Under natural conditions several kinds of gulls have been seen to swoop down and pick up young, such as the various arctic Skua Gulls (*Stercorarius parasiticus*, etc.; Wolley, in A. Newton, 1907; van Oordt, 1921). Black-backed Gulls in Labrador (Beetz and Townsend, 1916), Herring Gulls in western Europe (Möbius, 1870) and Glaucous Gulls, Ravens, Hooded Crows and even Rooks are mentioned (Collett, in Dresser, 1871-81). R. MacFarlane saw a white owl feeding on the eggs in Arctic America.

It is true that the gull tribe, especially the Skua and Black-backed Gulls, are important enemies at such times when their usual food is scarce, but it is also true that the observer gets an exaggerated idea of the amount of harm which gulls inflict because they follow him about and often pick up the young Eiders which he himself disturbs.

Other enemies, and perhaps the most important of all where they can get at colonies, are the Arctic foxes. The Eider in Labrador is between the devil and the deep sea. If he sticks to his old haunts on the outer islands, the fishermen get most of the eggs, but if he goes inland, he may fall into a worse plight among a plague of foxes. In some places (and probably only in certain seasons) the Arctic fox absolutely prevents reproduction (F. Fischer and von Pelzeln, 1886, on Jan Meyen; H. F. Lewis, 1923, Labrador.) Seals were mentioned as destructive to breeding birds in the Faroe Islands and it is possible that other species of seals do some damage to adults in various parts of the Arctic.

Millais mentions eagles and falcons in Iceland and C. B. Smith (1908) took a trout on that island, weighing four pounds, which had two very young Eiders in its stomach.

DAMAGE. Eiders have been accused of eating large numbers of scallops (*Pecten*) in New England waters. It is doubtful, however, if they do any real harm for



forty-four stomachs collected in Massachusetts by our U.S. Biological Survey workers showed only 5% of these shell-fish. These Eiders were shot near scallop-beds especially to determine the actual amount of damage done.

FOOD VALUE. Little need be said on this score. The flesh of Eider Ducks, especially old males, is unusually bad in my opinion. The young or immatures are better. I have eaten Eiders when off on an expedition in the North, well removed from fresh meat supplies, that tasted good; indeed with the aid of a little curry we made them into delicious (?) stews. But on the coast of Massachusetts in winter I always thought Eiders (some people to the contrary notwithstanding) about the worst of all the ducks. It goes without saying that Eiders are eaten everywhere with great relish by natives, both Indians and Eskimos. Their eggs are fairly good, although a little fishy to our refined tastes. I ate eggs in Greenland pickled and hard boiled that were not particularly bad, but we sometimes had seal grease for butter and Kittiwake Gulls for our greatest breakfast delicacy, so that I doubt if we were in a discriminating mood.

It appears to be customary to preserve the eggs in salt in many places in the North. It seems that our forebears were hardier men than we are, for, in the comfort of their homes, the epicures of New England actually sought after them, according to Audubon. That writer also says Eiders brought 50 or 75 cents a pair in Boston in 1832, but they were never popular in my time. Beetz (Beetz and Townsend 1916) says that Eiders are good from the age of fifty days to one and a half years, while their food is not so coarse or oily. But then Mr. Beetz lived in Labrador. Bränniche (1763) advised cooking them with hay or soaking them in vinegar. The physicians of his day considered them unhealthy especially for those who do sedentary work and particularly those who have had fevers!

HUNT. A method of hunting perhaps peculiar to this region was resorted to about Nantucket and Muskeget Islands in Massachusetts. Now that the shooting season closes so early very few are shot there. The sportsman found a shoal or long sandy point where he was certain that many Eiders were "hauling out." He then went there very early in the morning, dug a hole in the sand and crawled in, often not bothering with decoys. The birds that had the habit of coming to that particular place flew in from the sea and sometimes alighted almost in the shooter's face. As dead birds were picked up they were placed around the shooter to add to the attraction of the place. It was not often that large bags could be made in this manner.

I have had, in the old days, splendid shooting, but only on rare occasions, on the end of Monomoy Point off Chatham, Massachusetts, when the Eiders were making their daily flights. In a southwest or southeast gale in January it was possible to drop birds right on to the beach as they crossed the point, but any that reached the



water were lost for one could not use a boat. The largest bag I ever heard anything about in New England was made on the Salvages off Cape Ann in the winter of 1859 when two men shot eighty-seven in one day in December (Mackay, 1890).

Some are shot over decoys off rocky islands in Maine and farther east but they are not as a rule greatly disturbed there in winter.

The Indians in Labrador (Brewster, 1884) hunt them from canoes in the nesting season, letting their dogs run along the shore of points and islands. In this way they locate nests and often shoot the old ones too.

A good account of hunting methods in Norway and Sweden is given by L. Lloyd (1867) in his most interesting book on Scandinavian sport. He tells how they were shot over decoys made out of stuffed birds or wooden imitations. These were called "Wettar." He also speaks of sailing down upon them and shooting from small boats. This latter method is sometimes very successful on our own shores, as well as in Scotland and the northern islands (see Millais, 1913).

The Greenlanders get some with the bird-spear out of their wonderful *kayaks*, probably the most highly developed native hunting-boat in the world. I have seen them transfix a swimming gull with the greatest ease. South of the Yukon mouth, according to Nelson (1887), the Pacific Eider plays an important part in some of the religious festivals of the Eskimo, which take place in December.

A form of drop-net is used in Scandinavian waters, suspended between islands where the low flight of Eiders and their very regular coming and going render them rather easy victims (L. Lloyd, 1867). L. M. Turner (1886) says that the Aleuts in Alaska actually capture them at night by throwing small hand-nets over them as they roost on the shore, this especially on bright nights. The Greenland Eskimo make very beautiful quilts out of the skins of Eiders, with only the gray down adhering, the feathers having been plucked out. These quilts are usually trimmed with the skins of the heads and necks of the birds and when well made up they are greatly prized by the Danish residents.

I find that there is an old belief that such eider-skins (with only the down left on) were "highly salutary in application to the breasts of newly laid-in women" (O'Reilly, 1818).

**BEHAVIOR IN CAPTIVITY.** One would suppose that a duck with a diet so strictly limited to shell-fish and other sea-foods would not be able to get along at all in confinement on fresh water. Yet it not only lives well if carefully fed, but it has been known to live a long time, at least up to eleven years. But more remarkable still, it has actually nested and laid fertile eggs a number of different times and for several aviculturists. In spite of its being fairly easy to keep, it is almost never seen in zoölogical collections, where it could not help being a source of very general interest to visitors.



In 1888 and again in 1899 W. H. St. Quintin gave a short account of his experiences with Eiders. The first he got were from an Orkney fisherman, who reared a duck and a drake from eggs with considerable trouble, for he could not get the young to eat anything except earthworms. After arrival at Scampston they were found to do best on barley meal mixed with Spratt's poultry meal, moistened so as to form large pellets or balls with a small quantity of fresh ox- or rabbit-liver daily. For the first few weeks, he says, the young ought to have earthworms, the only thing they seem to like, but by degrees they can be trained to the adult diet. Old birds will eat bread freely and even grain when they are hungry. They would never eat winkles or mussels either whole or crushed and it was found necessary to shell them and to throw them on the water in that form. Fish they did not take to in any form. The drake of this first pair lived for nine years (when he was killed by a fox) and the duck lived two years longer.

Mr. St. Quintin reared some from these first birds and others hatched out of eggs sent to him from Northumberland. He advised keeping the young well protected from sun and says he lost several from a sort of heat stroke. He found that the young are apt to go off in a decline after getting fully feathered. But in spite of their being a good deal of trouble, Eiders, he concluded, are well worth while because they grow extremely tame and the courtship, voice and display actions are interesting to watch. He described the eclipse plumage of the drakes and said that his birds moulted their flight feathers in the autumn only, often casting all of them in twenty-four hours. He was also able to substantiate the observation of others, that incubating females do not leave the nest and never take either food or water; and he called attention to the use of wings under water.

In a letter to Millais, Mr. A. F. Moody, keeper for Mr. St. Quintin, goes into the care and breeding of Eiders at greater length.

Millais mentions a Mr. E. T. Booth who first kept and bred Eiders in England, but I have not run across any written record of this. As long ago as 1854, Wolley (A. Newton, 1907) tells of rearing one from the egg that lived over a year. Selby (1833) said he twice reared them from eggs and kept them for at least twelve months. They were also kept in the Knowsley collection about the same time. They were in the London Gardens in 1838 and bred there in 1841, 1848 and 1849 (P. L. Sclater, 1880).

Mr. Blaauw related his experiences with Eiders in a most interesting paper (1911). A young male received in bad condition in December, 1890, was fed on fish, meat, white bread, wheat and greens, and soon recovered and became tame. This bird he apparently kept for at least eleven years. In 1898 he received a female who two years later mated with this male and laid three eggs in a basket placed in the yard for this purpose. She sat very closely and was not seen on the water at all. He adds that she probably went off early in the morning, but more than likely she did not, like St. Quintin's birds, go at all. The young hatched in about twenty-eight days,



all three eggs being fertile. At first they fed on prawns and water insects and after a couple of days they began to eat bread. A rat took two of them, but the third grew up. On August 12 this bird (hatched July 1) was three-fourths grown and almost completely feathered. In November the first few white feathers appeared on the shoulders (the bird was a male).

In the summer of 1912 an Eider was reared from the egg in Regents Park, London, where the species had not been represented for forty-three years. It thrived on a diet of "gentles, chopped liver, bullock's heart and fish" (Millais). Of three specimens kept there in early days, the average duration of life was only fourteen months, with the maximum one year, five months (P. C. Mitchell, 1911).

HYBRIDS. There are several hybrids between this and the King Eider recorded (Leverkühn, 1890; Millais, 1913).

An extraordinary bird, the product of an Eider with a Mallard was described by W. Eagle Clarke (1912). It was shot on the island of Auskerry in the Orkneys where it paired for two years with a female Eider. It was said never to dive, but to feed like a Common Mallard.

#### GEOGRAPHICAL RACES

MUCH has been written during recent years on the geographical races which have from time to time been suggested. As long ago as 1831, Brehm divided the western European Eiders into eight or nine races. This of course was going much too far and more recent students, basing their work on very large collections (especially that of Mr. E. L. Schiöler), have thrown out a number of them. Hartert (1920a) believes that there are only two valid races in Europe: the typical Eider, *Somateria mollissima mollissima*, from Iceland, East Greenland, Scotland (on the outlying islands), Scandinavia, Nova Zembla and as far east as the Kara Sea; and the Faroe Island Eider which breeds only on the Faroe Islands. Annie Jackson (Meinertzhagen) admits *Somateria m. norvegica* (Norway east to Russian Lapland). E. L. Schiöler in a recent letter to me, says that *Somateria m. norvegica* should be retained as well as *Somateria m. faeroeensis* and he is inclined to think that Iceland birds are slightly different from Norwegian ones. Taking all the evidence into consideration and realizing, as I do, the great variation in head-form and coloration of our own east-coast Eiders I think that for the present we should recognize only the typical European Eider, the Faroe Eider, and a doubtful Norwegian race. In North America it is certain that Dresser's Eider (*Somateria m. dresseri*) with the wide, naked angle on the side of the forehead intergrades more or less with the Northern Eider (*Somateria m. borealis*) from farther north (see Beetz and Townsend, 1916). This intergrading of *dresseri* characters is even apparent in some, but not all specimens, taken as far north as southern Baffin Land (MacMillan expedition, 1922) and doubtless occurs more or less in Hudson Bay birds. It has even been noticed that this character of wide, naked angle is occasionally seen in Greenland specimens (letter from E. L. Schiöler). The black V-shaped chin-mark which characterizes all the males of the Pacific Eider (*Somateria m. v-nigrum*) has been found more or less developed on specimens of *Somateria mollissima* taken in Greenland (Schiöler, 1912) and also in the Orkneys (Pycraft, 1904) but these are merely individual variants and not true Pacific Eiders, or even intermediates. The brilliant orange bill of the Pacific Eider always differentiates it from these European specimens with a more or less well-marked V on the throat. The following races are therefore considered as valid:



## EUROPEAN EIDER

*SOMATERIA MOLLISSIMA MOLLISSIMA* (LINNÉ)

*Anas mollissima* Linné, Systema Naturæ, ed. 10, vol. 1, p. 124, 1758.

*Somateria mollissima* Fleming, Philosophy of Zoology, vol. 2, p. 260, 1822.

CHARACTERS: Size not extreme, less than Pacific Eider and larger than Faroe Island Eider. Green of head not extending as far forward as the eye. Length from posterior end of nostril to posterior end of naked angle on forehead less than from end of culmen to posterior end of nostril.

RANGE: Breeding on Iceland, East Greenland, Scotland and east as far as the coast of the Kara Sea. Intergrades with the Northern Eider (*Somateria m. borealis*).

## NORWEGIAN EIDER

*SOMATERIA MOLLISSIMA NORWEGICA* BREHM

*Somateria norvegica* Brehm, Oken's Isis, p. 998, 1830.

*Somateria mollissima norvegica* Schiöler, Dansk. Ornith. Foren. Tidsskr., vol. 8, p. 247 ff., 1914.

CHARACTERS: Has a steeper and less sloping forehead and in adult males the frontal angles usually are narrower and more pointed than in the last. Adult females less brilliant in color. Other and less important characters mentioned by Schiöler (1908-14). Not a well-marked race.

RANGE: Breeding on west and north coasts of Norway.

## FAROE ISLAND EIDER

*SOMATERIA MOLLISSIMA FAEROEENSIS* BREHM

*Somateria faeroeensis* Brehm, Oken's Isis, p. 998, 1830.

*Somateria mollissima faeroeensis* Schiöler, Dansk. Ornith. Foren. Tidsskr., vol. 8, p. 235 ff., 1914.

CHARACTERS: Smaller than the last; the smallest of all the races of the Eider. Wing of adult male 269 mm., culmen 64.5. The eggs are said to be a little smaller than in the true Eider but this apparently is not constant. Schiöler gives other differences such as the darker down color of young and the edge of the speculum "very vague."

RANGE: Faroe Islands.

## NORTHERN EIDER

*SOMATERIA MOLLISSIMA BOREALIS* (BREHM)

*Anas mollissima* Sabine (in part), Trans. Linn. Soc. London, vol. 12, pt. 2, p. 554, pl. 30, figs. 1, 2, 1818.

*Platypus borealis* Brehm, Lehrbuch Naturg. Europ. Vögel, p. 813, 1824.

*Platypus leisleri* Brehm, Ornis, vol. 1, p. 28, 1824.

*Somateria borealis* Brehm, Oken's Isis, p. 998, 1830.

*Somateria leisleri* Brehm, Oken's Isis, p. 998, 1830.

*Somateria planifrons* Brehm, Oken's Isis, p. 998, 1830.

*Somateria mollissima* Auctorum (in part).

*Somateria mollissima borealis* A. E. Brehm, Verzeich. Sammlung. Europ. Vögel, p. 14, 1866.

CHARACTERS: In the adult male the bill from the posterior edge of the nostril to the tip is shorter than



in *Somateria m. mollissima*, rather under than over 36 mm. It is also more brilliantly colored (bright orange-yellow) and the breast is said to be paler buff-color (brighter?). I cannot see that the longer and more falcate sickle-shaped innermost secondaries are a constant character in this race, which at best is very poorly marked and doubtless intergrades freely in Greenland with *Somateria m. mollissima*. The females can often be differentiated from European Eiders by their somewhat smaller and lighter bills and they are said to average very rich (reddish) in color. Wing measurement about as in *Somateria m. mollissima*. (Mr. Schiöler thinks it is smaller than the typical Eider.)

RANGE: Greenland, at least the west coast, Baffin Land, northern Labrador, and the northern portions of Hudson Bay intergrading with *Somateria m. dresseri* in eastern Labrador and in Hudson Bay. South in winter to Massachusetts (rarely). Westward, this race possibly intergrades with *Somateria m. v-nigrum* in the vicinity of Banks Land, Prince Albert Land and Parry Island (about 100° to 120° west longitude).

#### DRESSER'S EIDER

##### SOMATERIA MOLLISSIMA DRESSERI SHARPE

*Somateria dresseri* Sharpe, Ann. Mag. Nat. Hist., ser. 4, vol. 8, p. 51, fig. 2, 1877.

*Somateria mollissima*, var. *dresseri* Coues, Birds of Northwest, p. 580, 1874.

*Somateria mollissima dresseri* Ridgway, Proc. U.S. Nat. Mus., vol. 3, pp. 205, 222, 1880.

CHARACTERS: Similar to northern Eiders, either *Somateria m. mollissima* or *Somateria m. borealis*, except that the naked angles on the sides of the forehead in the males are much broader and more rounded instead of narrow and pointed. This character is not so apparent in the female, but all or nearly all females can be separated from the northern Eiders (both *borealis* and *mollissima*) by the following measurement. In Dresser's Eider the distance from the posterior end of the nostril to the posterior end of the naked frontal angle is as great as or greater than from the posterior end of the nostril to the tip of the culmen. In the other Eiders the reverse is the case. The adult male has the green color of the head extending forward as far as or beyond the eye. An indistinct black V-shaped mark on the throat is sometimes present, but this is also occasionally seen in the Eiders of Greenland and Europe. Size about the same as in the Northern Eider.

RANGE: Breeds in eastern Labrador from about Hamilton Inlet south to Newfoundland, the Gulf of St. Lawrence, Nova Scotia, and Maine; also in the southern parts of Hudson and James Bay, north to Fort George, Great Whale River and Richmond Gulf on the east side, and on the west side to Fort Churchill and Cape Eskimo. This race intergrades with typical Northern Eiders (*Somateria m. borealis*) both in eastern Labrador and in Hudson Bay and these intermediate types have been found as far north as Baffin Land. South in winter to Massachusetts, the Great Lakes and rarely to the coast of Virginia. Sporadic on west coast of Greenland? (E. L. Schiöler collection).

#### PACIFIC EIDER

##### SOMATERIA MOLLISSIMA V-NIGRUM GRAY

*Anas mollissima* Pallas (in part), Spicilegia Zool., vol. 5, p. 28, 1769.

*Anas cutberti* Pallas (in part), Zoographia Rosso-Asiatica, vol. 2, p. 235, 1811.

*Somateria v-nigra* G. R. Gray, Proc. Zool. Soc. London, p. 212, pl. 107, 1855.

*Somateria v-nigrum* Bonaparte, Comptes Rend. Acad. Sci. Paris, vol. 43, p. 650, 1856.

CHARACTERS: The adult male always has a large prominent V-shaped black mark on the chin and throat, the green of the face extends forward as in Dresser's Eider under the eye or even beyond it. The bill is always brilliant orange to orange-red in color. The feet are paler and more yellowish than



STELLER'S EIDER

Male

Female

SPECTACLED EIDER

Male

Female

NORTHERN EIDER.

Male

Female

DRESSER'S EIDER

Male

Female

PACIFIC EIDER

Male

Female

KING EIDER

Male

Female

BILLS OF EIDERS

*Allan Brooks.*







in the other Eiders. In size this race is large, the wing over 300 mm. up to 328 mm. The bill is as a rule larger than in the Northern Eider and the naked frontal angles are short as in the Northern and the European races. Eggs slightly smaller (or at least shorter) on the average than those of other races (?).

**RANGE:** Limits not clearly defined, but breeds from the southwest coast of Victoria Island (Coronation Gulf?), the mouth of the Coppermine River, Franklin Bay and the northern coast of Alaska to western Alaska, and south to Seldovia, Kadiak Island and Kachemak Bay, also Copper Island, Attu, Agattu, Kiska, Tanaga and Atka Islands. On the coast of northern Siberia it also breeds for an undetermined distance westward, at least to the Ajon Islands. South in winter to Puget Sound and rarely inland as far south and east as Lake Winnipeg; casual on Slave River in summer (Wm. Rowan, *in litt.*).



# KING EIDER

*SOMATERIA SPECTABILIS* (LINNÉ)

(Plates 80, 81, 82)

## SYNONYMY

- Anas spectabilis* Linné, Systema Naturæ, ed. 10, vol. 1, p. 123, 1758.  
*Anas beringii* Gmelin, Linné's Systema Naturæ, ed. 13, vol. 1, pt. 2, p. 508, 1789.  
*Anser beringii* Bonnaterre, Encyclop. Méthodique, vol. 1, p. 121, 1790.  
*Anas mollissima* Temminck (in part), Manual d'Ornith., p. 549, 1815.  
*Somateria spectabilis* Leach, in Ross's Voyage Discovery, app., p. xlvihi, 1819.  
*Platypus spectabilis* Brehm, Lehrbuch Naturg. Europ. Vögel, vol. 2, p. 816, 1824.  
*Fuligula spectabilis* Bonaparte, Ann. Lyceum Nat. Hist. New York, vol. 2, p. 389, 1826.  
*Somateria pectoralis* Lichtenstein, Nomenclator Avium, p. 103, 1854.  
*Somateria megarhynchos* Brehm, Vogelfang, p. 389, 1855.  
*Somateria altensteinii* Brehm, Vogelfang, p. 389, 1855.  
*Anas superba* "Leach," *fide* Baird, Brewer and Ridgway, Water-birds No. Amer., vol. 2, p. 83, 1884.

## VERNACULAR NAMES

- English:* King Eider, King Duck, Gray-headed Duck, Bering Goose, Mongrel Drake, Passing Duck, Wamp's-cousin, Canvas-back, Isles of Shoals Duck.  
*German:* Prachtente, Prachteiderente, Königsente, Königseidergans, Buckelschnäbliger Eidervogel.  
*French:* Eider à tête grise, Eider superbe, Eider royal, Eider roi, Eider remarquable.  
*Italian:* Re degli Edredoni, Re degli Eider.  
*Icelandic:* Aedarkongur, Blikakongur.  
*Faroese:* Eave kongur, Aedukongur.  
*Esthonian:* Krahshnä-pihle.  
*Norwegian:* Ekonge, Erkonge, Spitsberg-edderen, Haaf-aarre, Havorre, Savorre, Bukkelnaebbet Edderfugl, Praktedderfugl, Spitsbergerfugl, Edarkong, Kongeederfugl.  
*Swedish:* Prakt-Ejder, Kamgiding, Kamgudunge, Äderkong.  
*Danish:* Pragt-Ederand, Pragt-Ederfugl, Konge-Ederfugl, Pukkelnaebet-Ederfugl.  
*Lapp:* Buosnjun-havdda, Appe-akta, Borssanjun-havdda.  
*Finnish:* Pulska-haakka.  
*Polish:* Kaczka okazala.  
*Russian:* Pistrak, Grebenushka, Normota.



*Czech:* Kahajka krasna.

*Croatian:* Krasna gavka.

*Japanese:* Kewatagamo.

*Samoyede:* Vorak, Samartur.

*Kuriles and Kamchatka:* Mitu.

*Eskimo:* Siorakitsok, Arnaiartak, Kingalik, Kaiortok, Metek-we-aho (Greenland);  
Kingalik (Baffin Land); Gna-lik, Kinalui, Annabia (Alaska).

## DESCRIPTION

**ADULT MALE:** Whole top of head and occipital region a beautiful light gray-blue often margined behind by a black line. A black line of feathers, sometimes broad, at other times narrow, surrounds the naked frontal angle and extends down to the point of the frontal feathering. There is a small black patch below the eye and a large heavily marked black V-shaped patch on the chin and throat, corresponding to the same pattern in the Pacific Eider (*Somateria mollissima v-nigrum*). The rest of the face, throat and neck are white tinged on the lores and sides of occiput with very pale green. Mantle white, shading into buff at the sides. Scapulars, back, center of rump and the upper tail-coverts very dark brown, almost black, the long stiff scapulars deeply emarginated on the outer web. Tail nearly black. On the sides of the rump a large white patch. Breast pinkish buff sharply defined from the black of the rest of the lower parts. Lesser and median coverts white, but the angle of the wing, as well as the greater coverts, outer secondaries and primaries, black, there being some variation in the amount of black at the bend of the wing. Innermost secondaries long and falcate in shape, as in the Common Eider.

Iris dull yellow to bright yellow. Bill with the large frontal angles bright orange to reddish orange; rest of bill flesh-colored to orange with the nail lighter colored. Legs and feet dull orange to orange-red with the webs dusky.

Wing 270–288 mm.; bill 28–34; tarsus 45–50.

Weight 4.5 to 5.5 pounds (2.04 to 2.49 kilograms) (Millais). This weight is certainly high enough and the average probably is not over 4.5 pounds.

**ADULT FEMALE:** Resembles the Common Eider very closely, but is always distinguished by the much smaller bill and the prolongation of the frontal feathering down to the level of the nostrils. The loreal feathering does not extend as far forward as the frontal feathering. The naked frontal angle is much shorter than in the Common Eider. The character of ruddier plumage given by Salvadori and others is unreliable because the plumage of all female Eiders fades out very much late in the winter. Head and neck without the conspicuous black streaking of the Common Eider. Remainder of body plumage and wing very nearly the same as in the Common Eider.

Iris dull yellow. Bill greenish to greenish gray or lead-color. Legs and feet dull greenish gray to dull yellow, with the webs blackish.

Wing 260–282 mm.; bill 30–35; tarsus 45–48.

Weight about 4 pounds (1.81 kilograms) (Millais).

**FEMALE IN FIRST (JUVENAL) PLUMAGE:** Differs greatly from adult female in being grayer all over and in lacking the black and rufous and barred portion on the mantle, scapulars and back. The chin and throat are very pale buff or gray buff, while the whole lower side is pale gray or brown-gray, scarcely barred except on the breast. The tail-feathers are blunt at their tips and there is no white bar on the greater wing-coverts.



**MALE IN FIRST (JUVENAL) PLUMAGE:** Like the female but secondaries (speculum) somewhat darker, and early in the autumn darker feathers come in on the lores, chin and cheeks. Bill-shape at first is almost like that of juvenal female and the color little if any brighter.

**IMMATURE MALE:** In general the King Eider may be said to follow the same scheme of plumage change as does the Common Eider and is completely adult as soon as he comes out of his second eclipse, that is at twenty-eight to thirty months of age.

The first changes in the young male are seen always on the head. The sides of the face down to the region which will carry the adult V-shaped mark are nearly black while new white and gray-white feathers begin to appear on the throat and around the neck. Some birds do not begin to show much change about the head until late January, while others are changing rapidly by late November. Black scapular feathers and white feathers in the mantle, upper breast and sides of breast appear some time during the winter but progress is very slow and very variable. Forward birds become almost pure white on the mantle, upper breast and chin by mid-winter and have the future V-shaped patch plainly outlined. Others show few changes until spring. Black feathers almost always appear on the sides and flanks some time during the winter but the lower breast and abdomen remain almost unchanged, fading out a good deal toward spring. The inner secondaries are never so long or falcate as in older birds. In the first eclipse plumage the young male is dark all over and looks very much as in adult eclipse, but juvenal feathers are retained on the under parts.

During the second winter and spring the young male after he has come through his first eclipse (often much delayed as in the other Eiders), has the general appearance of an adult, but he may be distinguished from the adult by the following characters: Wing with the "lesser coverts brown-black, median with less white and mostly tipped blackish and sometimes uniform sepia, two or three only marked with white (amount of white on wing-coverts varies individually)" (Witherby *et al.*, 1919-22). The same authority says that the gull-gray feathers of the occiput have dusky-brown tips when fresh, while the feathers of the cheeks, sides of neck, nape, mantle and upper breast are more or less tipped blackish (at first). In the specimens in second-winter plumage before me the green patches of the face are not yet fully developed (November) and the frontal angle of the bill is not as wide as it will be. No doubt in their second spring, March to June, these young males can only be distinguished by the darker coverts. The second eclipse is said to be similar to the adult eclipse but I have not seen specimens.

**ADULT MALE IN ECLIPSE:** The old male carries his spring dress rather late into the summer; specimens taken by Koren in Arctic Siberia (Museum of Comparative Zoölogy) on August 3 are by no means yet in complete eclipse and retain many old mantle and breast feathers, while the old wings and tail are still present. Other Arctic travelers noted the same thing. The moult starts about the neck region, sides of head, chin and throat. When the change is complete all the white parts are brown-black except the wings and perhaps a small area on the upper breast. The lores and cheeks are lighter than in the Common Eider and the feathers buff, "broadly tipped black-brown." The chin and throat are dusky white, the feathers mostly tipped ash-brown.

**ADULT FEMALE (summer):** The deep ruddy brown of the fresh plumage fades out very markedly toward spring, so that in June this sex looks very different. In August and September (a plumage I have not examined) the feathers of the upper parts have paler edges than in winter. "Crown and upper parts of nape heavily streaked brown-black, rest of nape ash-brown, feathers more or less edged buff; feathers of mantle and scapulars edged cinnamon-buff, new feathers of back and upper tail-coverts as mantle but tips narrower, tail-coverts with irregular blackish subterminal bars; new feathers of upper breast paler; sides of body and flanks as scapulars" (Witherby *et al.*, 1919-22).



**YOUNG IN DOWN:** Upper parts and sides of body as in the Common Eider but lighter; cheeks lighter and line through eye indistinct. Chin, throat and under parts pale ashy white; down of upper breast dusky brown toward base. Loreal and frontal feathering as in adult female (Witherby *et al.*, 1919-22). The difference in color between this and the Common Eider is slight. The long frontal and short loreal feathering are the chief diagnostic marks.

### DISTRIBUTION

THE King Eider has a distribution very similar to that of the Common Eider, perhaps somewhat more extended and less concentrated. It is by no means as numerous as its relative, but small numbers are frequently found among the large Eider Duck colonies and in winter the King Eider is much more likely to straggle far south.

### BREEDING RANGE

IN North America the center of the breeding range is formed by the coasts of the great Arctic islands. On the Alaskan coasts it is a rarer breeder. Unfinished nests have been taken as far south as Kadiak Island (Littlejohn; U.S. Biological Survey notes). L. M. Turner (1886) thought some nested on the eastern Aleutian Islands and about St. Michael's, but there is no definite evidence of breeding in either of these localities. To be sure, the species is common about the coasts from Nushagak and Bristol Bay (Osgood, 1904), St. Mathew's Island (G. D. Hanna, 1917) and St. Lawrence Island (Nelson, 1887; W. S. Brooks, 1915; Wm. Percy, *in litt.*), but these specimens are no doubt chiefly young non-breeding birds. A few nest on St. Lawrence Island (U.S. Biological Survey) and along the north coast about Icy Cape and Point Barrow (Murdoch, 1885; Nelson, 1887; Seale, 1898; R. M. Anderson, 1915), but most of them go farther east. Large numbers nest about the coasts of Liverpool and Franklin Bays (R. MacFarlane, 1908; R. M. Anderson, 1917) and undoubtedly along the entire littoral as far as Hudson Bay (Stefánsson, 1913). Low (1906) discovered nests about Cape Fullerton and on Southampton and neighboring islands. On the Arctic islands it has been found breeding on Banks Land, the Parry Islands, on Wellington Channel, the Gulf of Boothia, Melville Peninsula and at Port Bowen in northwestern Baffin Land; it is common throughout King Oscar Land and has been found breeding in Grinnell Land and Grant Land (U.S. Biological Survey; Preble, 1908; Sverdrup, 1904; Stefánsson, *in litt.*; Feilden, *fide* Schalow, 1905; MacMillan, 1918). In Greenland the King Eider probably nests as far north as the extreme limit of land (Cooke, 1906). It is a particularly common nester from the vicinity of Etah southward to Upernavik and Disco Bay, but it is very doubtful if any nest south of latitude 66° on the west coast of Greenland (Winge, 1899; W. Stone, 1892, 1895; L. Gibson, 1922). On the west side of Davis Strait the species has been seen in Cumberland Sound (Kumlien, 1879) and Hantzsch (1914; Hesse, 1915b) found the species nesting in great numbers on the rocky islands and shores of the great lakes in southern Baffin Land. South of Hudson Strait the King Eider breeds in small numbers on the north coast of Labrador, especially about Ungava Bay (Pyne, *fide* J. and J. M. Macoun, 1909; Hantzsch, 1908). On the east coast the breeding area does not appear to extend south of Nachvak (C. W. Townsend and Allen, 1907), though stray specimens have been taken at Lake Mistassini in the interior (J. and J. M. Macoun, 1909; Low, 1913) and non-breeding summer birds are by no means rare along the entire east coast of Labrador (Packard, 1891). The statement that the species nests on the Mingan Islands in the Gulf of St. Lawrence (Comeau: *Canad. Sportsman and Nat.*, July 15, 1881) appears to me to require further confirmation. A non-breeding bird taken in June on James Bay by Low has been recorded by J. and J. M. Macoun (1909).

The southern limit of the breeding range in Greenland is uncertain. It has been taken as far south as Pinsortok in latitude 62°, and farther north at Angmagsalik (Helms, 1904; Schalow, 1905). Kolthoff (1903) found great numbers in northeastern Greenland between Cape Broer Ruys and MacKenzie Gulf, and Manniche (1910) records the species as rather common and nesting about Stormkap, Skenaes, Hvalrosodden, and especially about the Mallemuk Mountains (80° north latitude).



Faber (1822) states that the King Eider nested in Iceland on one occasion, and the assertion has been made by various other writers, but more recent authorities (Slater, 1901; Hantzsch, 1905) are agreed that there is insufficient evidence of nesting, though stray birds are seen in summer from time to time. Specimens have occasionally been taken in summer on the **Iceland** **Faroes** (H. C. Müller, 1869) but there is no evidence that they nest there. The same is true of the Shetlands and of the coasts of Scotland. A specimen was taken on June 29, 1910, on the Shetlands and others have been taken on the Orkneys and on St. Kilda in summer, but there is no acceptable evidence of nesting (Millais, 1913; Witherby *et al.*, 1919-22; *et mult. al.*).

There is not even any satisfactory evidence of breeding on the coasts of Norway or anywhere else in western Europe. F. Fischer and von Pelzeln (1886) state that a pair was seen on Jan Mayen, and others have been seen on Bear Island (König, 1908). Though less abundant than the Common Eider on Spitzbergen (Schalow, 1905; von Heuglin, 1874; Bianchi, 1902c; Mathey-Dupraz, 1912), the species is not uncommon in some localities and has been found nesting on Prince Charles Foreland (Jourdain, 1922), in Advent Bay (König, 1908; Le Roi, 1911), at Whales Point Bay (A. Walter, 1890), on Edge Island (Michailovski, *fide* Schalow, 1905) and at Cape Boheman (Ice Fjord), at the last locality in some numbers (van Oordt, 1921). According to Munsterhjelm (1911) King Eiders are said to nest on Abel Island also.

Spörer (1867) discovered this duck on the north coast of Nova Zembla and von Nordenskiöld (1882) found it common and nesting in the south. On the other hand H. J. Pearson (1899) says he saw two hundred males but found no eggs. According to Schalow (1905) this Eider nests on Waigats and Dolgoi. On the mainland it nests on the Murman coast and in East Finmark (Bianchi, 1902b; Wallengren, 1854), straggling into the interior about Enare and Utsjoki (Palmén, 1876). Farther east it is known to nest on the Kanin peninsula (Seeböhm, 1882a) and commonly on Kolguev (Trevor-Battye, 1895).

In Asia the breeding range, unlike that of the Common Eider, includes the entire Arctic coast (Buturlin, in Dresser, 1908-09). Zitkov (1912) met with the species on the Yalmal peninsula and Popham (1897) took a nest without eggs at Golchika on the lower Jenesei. It is a common nesting bird on the coasts of the Taimyr peninsula (A. T. von Middendorff, 1853; Walter, 1902). Von Bunge and von Toll (1887) found the species nesting on the New Siberian Islands, and Birulia (1907) also found nests there. It is a common breeder about the mouth of the Lena (Bunge, 1883) and thence eastward along the coast to Bering Strait (Nelson, 1887; Birulia, 1907; Thayer and Bangs, 1914; W. S. Brooks, 1915; Riley, 1918). No doubt a few nest along the coast of Bering Sea, for Barrett-Hamilton (1900) took a female and duckling at Karaginsk, Kamchatka, and J. A. Allen (1905) has recorded specimens from Gichiga and was told that this duck nests at Marcova.

#### WINTER RANGE

LIKE its relative, the Common Eider, the King Eider will winter wherever there is open water. On the Pacific coast it stays to some extent about Unalaska and the Alaska peninsula (Dall, 1874; L. M. Turner, 1886; U.S. Biological Survey) and is particularly common about Kadiak Island (Bretherton, 1896; Littlejohn, MS.). There are no other winter records from the Pacific coast with the sole exception of two from California, where one was taken near San Francisco in the winter of 1879-80 (Henshaw, 1880) and another on the Suisun Marshes near San Francisco Bay in the winter of 1902-03 (Loomis, *fide* Grinnell, Bryant and Storer, 1918).

On the Atlantic side of North America the King Eider winters as far north as southern Greenland (Chamberlain, 1889). Specimens may also be found on the Labrador coast wherever there is open water (C. W. Townsend and Allen, 1907), while on the Newfoundland coasts it is common (J. and J. M. Macoun, 1909). In the Gulf of St. Lawrence it is moderately common (Cooke, 1906; Schmitt, 1904; Beetz and Townsend, 1916; Chamberlain, 1882) and occasionally small numbers go up the river to winter on the lower Great Lakes (Fleming,









MAP 102. Distribution of Kingbirds  
Breeding range, dotted line  
Occasional records, small dots





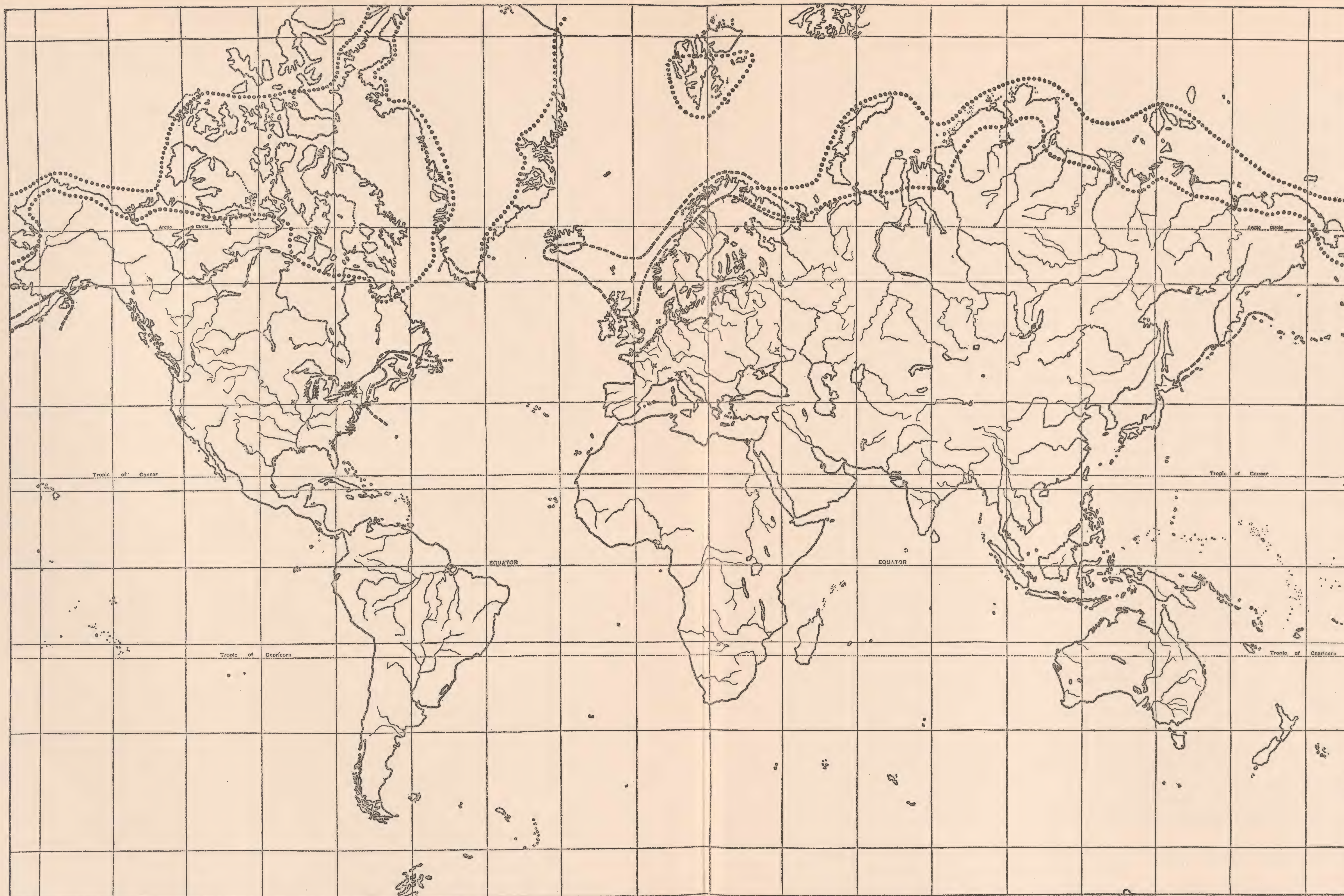
*Somateria spectabilis*

range, broken line  
by crosses (X)









MAP 102. Distribution of King Eider (*Somateria spectabilis*)

Breeding range, dotted line; winter range, broken line  
Occasional records indicated by crosses (X)







1906; C. W. G. Eifrig, 1910). Along the coasts of Nova Scotia it is a rare bird in winter (Downs, 1888) and the same is true of the entire coast of New England (G. M. Allen, 1909; *et mult. al.*). For example there are only about two dozen reliable records for the Massachusetts coast (W. S. Brooks, 1913a). Along the coasts of Long Island it is a regular but by no means a common visitor except in certain years (Eaton, 1910; Griscom, 1922-23) and farther south and west it can hardly be called more than a straggler. It is rare on the coast of New Jersey (W. Stone, 1909) and Delaware (Rhoads and Pen-nock, 1905), but has straggled as far as Cape Charles and Cobb Island, Virginia (Rives, 1890; Whit-taker, 1897) and even to the Altamaha River, to Ossabaw Island and to St. Catherine Island, Georgia (Worthington, 1890; Wayne, 1910).

There are many more records for the King Eider in the interior than for the Common Eider. Specimens on migration have been seen on the upper MacKenzie and about Great Slave Lake (Preble, 1908) and an immature male was taken near Calgary, Alberta, on November 4, 1894 (Dip-pie, *fide* J. and J. M. Macoun, 1909). There is an unsatisfactory record of its occur- **Interior**  
rence in Minnesota (Hatch, 1892) and there are several records for Wisconsin  
(Kumien and Hollister, 1903; H. L. Ward, 1907). On November 29, 1917, a small flock appeared  
off Chicago (C. W. G. Eifrig, 1919a) and there are some dozen records of its occurrence on the  
Michigan shore of Lake Michigan (Barrows, 1912; E. S. Wilson, 1921). There are about four reli-  
able records for Ohio (L. Jones, 1903) and a considerable number from both sides of Lake Ontario  
and from the lakes of western New York (Fleming, 1906; Eaton, 1910; Sennett, 1890). On one occa-  
sion a specimen was taken on the Mississippi near Keokuk, Iowa (R. M. Anderson, 1907).

In Europe the King Eider occasionally winters in Iceland (Hantzsch, 1905), but it is an exceedingly  
rare visitor to the Faroes (H. C. Müller, 1869) and to the coasts of the British Isles. **Iceland**  
Specimens have been taken in the Shetlands and Orkneys and on the coasts of Scot- **British Isles**  
land, but there are only about half a dozen records for the English coast (Norfolk, **Europe**  
York, Northumberland, Kent) and about the same number for Ireland, from coun-  
ties Dublin, Down and Mayo and from Rathlin Island (Ussher and Warren, 1900; Smalley, 1906;  
Millais, 1913; Witherby *et al.*, 1919-22; etc.).

On the Continent the King Eider winters regularly on the northern coasts of the Scandinavian pen-  
insula, eastward on the Arctic coast at least as far as the Kanin peninsula (H. J. Pearson, 1904) and  
southward on the Norwegian coast as far as the Arctic Circle. On the southwestern coast of Norway  
it becomes rare, though specimens are recorded from Kristiansund, Bergen, Tvedestrand and Hvaler  
(Boie, 1869; Collett, 1873; Schaanning, 1913). On the coasts of the Baltic specimens have been taken  
in southern Sweden (Nilsson, 1858) and on the southern coast of Finland (Wallengren, 1854; Palmén,  
1876; Palmgren, 1913). There is one record of its occurrence near Petrograd (Bianchi, 1907) and one  
or two specimens have been taken on the coasts of Esthonia and Latvia (Goebel, 1873; Loudon, 1909).

King Eiders have been twice taken on the Baltic coast of Germany: once near Danzig and once on  
Usedom Island (Naumann, 1896-1905; Reichenow, 1920a; etc.). Specimens have occasionally been  
taken off the coasts of Denmark (Kjærbølling, 1850; Dresser, 1871-81; Winge, *fide* Millais, 1913) and  
once on Helgoland (Gätke, 1895). There appears to be no authentic record for Holland and on the  
coasts of Belgium it is only "said" to occur (Dubois, 1886). On the French coast examples have been  
taken at Dunkirk (van Kempen, 1902), at Boulogne (Degland and Gerbe, 1867), at Cayeux-sur-mer  
at the mouth of the Somme (d'Aubusson, 1911) and on the coast of the Departement Manche (Paris,  
1911). It is also said to have been taken in the interior, Departement Saône-et-Loire (Paris, 1911).  
Four specimens are recorded from Italy, as follows: Venetia, 1888; Ravenna, 1892; San Remo, 1901;  
Venetia, 1904 (Giglioli).

According to Severtzoff (quoted by Poljakoff, 1909, p. 587) a specimen was taken in September,  
1848, in the government of Voronesh in southern Russia.

Practically nothing is known of the winter range of this duck in Asia. Thayer and **Asia**  
Bangs (1914) state that a number wintered on the Diomed Islands in Bering Strait,



while Stejneger (1887), Bianchi (1909) and Hartert (1920a) all describe it as rare in winter on the Commander Islands. According to Stejneger (1898) and Hatta and Murata (1905-06) the King Eider is found in the Kurile Islands, and Mr. Kuroda, while agreeing on this point, writes me that the species does not occur on Yezo.

#### MIGRATION

THERE are certain features in which the migration of the King Eider differs from that of the Common Eider. In the first place this duck is more erratic in its movements and scatters inland much more commonly. There is reason to suppose that there may be well-marked inland routes to the Great Lakes of Canada by way of the MacKenzie valley. So many have been taken in Lake Ontario, as well as Lakes Erie and Michigan that it cannot be called merely accidental in the interior. A number of flocks have made their appearance at Niagara and in 1879 about eighteen were shot there. This must have meant something more than mere straggling or lost birds. A small migration down the MacKenzie is indicated (Preble, 1908) and a few seem to reach Point Barrow, Alaska, by some cut over the land (Murdoch, 1885).

Owing to the fact that these Eiders follow close along shore in spring, right over the solid ice, they are seen and shot more often than other ducks. The spring flight is very early indeed and by the first days of May it has passed Nome. At Point Barrow it may arrive as early as April 27 (Murdoch, 1885) but in some seasons not till the 17th of May. The main flight usually passes during the middle of May and all are gone by the first week in June. Lord William Percy writes that on the coast of Siberia from St. Lawrence Bay to East Cape there were many non-breeding birds but for a short period at the end of June there were very few to be seen inshore. A week later, that is, early in July, huge flocks of old males, some of them in half eclipse, were flying south through Bering Strait. This is the most remarkable fact connected with this duck, that breeding males do not tarry more than a very few weeks on their actual nesting grounds and are flying west all along the Canadian and Alaskan Arctic coast as early as July 11. In fact, at Cape Bathurst, Stefánsson noticed some moving west on the 30th of June. This flight of males is at its height in the middle of July and is all over by the last of the month. It seems to be earlier than the same movement in the Common Eider and even more marked in volume.

There is a movement in the same direction of other King Eiders (immatures, sterile females or unsuccessful nesters?) throughout the summer but the females with their young pass along the same route late in the summer. The first of these appeared at Point Barrow on August 30 and continued all through October. In an ordinary year the waters are then frozen but in a mild season (1882) they were seen about the Point as late as December 2.

In Baffin Land, Hantzsch says they arrived as early as April 18, coming all through May with the Common Eiders. The males began to leave the females by late June and were all gone by July 20. The females and young stayed in the Kennedy Lake until the last of August.

The migration of this Eider takes it all along the Labrador coast, through the Straits of Belle Isle, past Newfoundland, but according to Beetz, not as far up the Gulf of St. Lawrence as the other Eiders. It reaches New England waters by November 14 (earliest October 21). It is taken in the Great Lakes region after November 13. In the spring it usually leaves our coast in March and early April, the latest about April 13.

In West Greenland these ducks are said to go up the coast later than the Common Eider and come back sooner (Holböll, 1846), but of this I am not at all sure. It seems to me that the migration, at least in the Far North, is exceptionally early.

A female having a copper arrow-point characteristic of the "central" Eskimos was shot in Greenland on January 9, 1897. It was thought that this bird must have come at least three hundred kilometers (Krabbe, *Ornith. Monatsschr.*, 1910, p. 68).



## GENERAL HABITS

THIS Eider, circumpolar in its distribution like the Common Eider and its races, is nevertheless even more of an arctic breeder. But the actual breeding sites are characteristic in that they are almost always in fresh ponds or tundra pools removed a little way from the sea and never on outlying islands or the actual coast-line. No doubt this duck is far more plentiful than is commonly supposed for it comes little into contact with civilized man, and its nests being much more scattered are less easily discovered and robbed.

In winter the King Eider is far more apt to straggle farther to the south all over its range, and it is more uncertain in its flights, turning up at all sorts of unexpected inland places where the Common Eider is never seen. A comparative study of the anatomy of this and *Somateria m. mollissima* would be extremely interesting. No doubt some very marked differences in structure could be pointed out.

WARINESS. This duck has the reputation of being wilder in disposition than its relatives. There is probably some truth in this. It is certainly much less sociable by nature and apt not to feed so close to coast-lines, often diving in very deep waters. But it is not so much afraid of hugging the shore in its migration, or even of crossing headlands, hence it is shot in large numbers by Eskimos.

It is tame on its breeding grounds and the female sits extremely close during incubation. Nevertheless von Heuglin (1874) spoke of them as "very cautious" in Nova Zembla and Hantzsch (1905) found them "very shy" in Iceland. Nelson speaks of them as not shy in northern Alaska and says he could row down within gun-shot of them in the open sea.

DAILY MOVEMENTS: Do not differ from those of the Common Eider.

GAIT, SWIMMING AND DIVING. In general appearance and form it is so Eider-like as to be often overlooked when among flocks of the commoner species.

The almost black wing and the long black scapulars of this Eider distinguish the males at a great distance when in full plumage.

Griscom (1922-23) says it is possible under favorable circumstances to distinguish the adult female King Eider, but the diagnosis would, I should say, only be possible when she was among several females of the common species. The main differences (noted under Description) are the smaller bill and the prolongation of the frontal feathering forward on the bill to as far as the nostrils. This would scarcely ever be apparent in the field. The general coloration is usually spoken of as a warmer or ruddier brown but this is not reliable on account of the great changes in plumage color of all female Eiders during winter and spring. In fresh autumn plumage



females of both species are much richer and darker, a tone which always fades out more or less by March or April. Various minor characters are given by Griscom, but he adds that "the majority of females and immatures are absolutely indistinguishable in life, unless accompanied by adult males." With this I heartily agree.

This Eider is said to use its wings more or less under water. There is also a good deal of evidence that it can and does feed in deeper water and stays under longer than the others. Norton (1900) found this out when watching a flock in winter in Maine and Holböll (1846) recorded the same thing many years ago. The older author, in fact, went so far as to say that they usually remained under water for four to six minutes and that he had found their dives lasting for nine minutes! Such statements are of course entirely beyond the possible limits for submersion. Hagerup (1891) noticed that in southern Greenland they sought deeper waters in winter.

One was said to have been taken from a gill-net in Lake Erie, near Cleveland, that was fifty-five feet under water (Sterling, 1890) reminding one of the immense depths at which the Long-tailed Duck is sometimes taken in trout and white-fish nets in the same lake.

**FLIGHT.** Enormous flights of these Eiders are seen in certain places on migration. In spring the flocks in northern Alaska are especially large and as a rule fly separately from Common Eiders. They travel like other Eiders in long diagonal lines, occasionally bunching together and following close to the water along the edge of the ice leads. Often, however, they go east along northern Alaska over the ice, before it has begun to break up. The flocks of males returning from the breeding grounds are also large and sometimes almost continuous. But the autumn flocks are much smaller, just as they are in other species. In Baffin Land in spring Hantzsch (1914) spoke of the spring flocks as coming in a long crowd, rarely in wedge formation.

In the spring the flights in May consist of paired birds and if a female is shot down the male "almost invariably follows her to the ice" (Murdoch, 1885).

**ASSOCIATION WITH OTHER SPECIES.** The King Eider does not as a rule associate closely with Common Eiders. As a matter of fact his migration times are not the same; neither are his routes of travel. He goes away from the actual coast-line to nest and although a few odd birds may be found living among colonies of Common Eiders they are usually found not to belong to breeding pairs. Van Oordt (1921) never saw males of this and the Common Eider flocking together in Spitzbergen and Bretherton (1896) found them in winter about Kadiak Island mostly with Steller's Eiders and Long-tailed Ducks. Lord William Percy writes me that on the Arctic coast of eastern Siberia they frequently associate with the Spectacled Eider, but



rarely with Steller's Eider. No doubt the females and immatures are mixed up a good deal with flocks of the common kind.

An interesting tale was related by F. Boie (1822). That writer mentions the case of a pair of King Eiders that intruded themselves into a large colony of preserved Eiders, so that it was necessary to shoot the male owing to his very quarrelsome nature. Several travelers have found them most quarrelsome in spring, besides being restless. Hantzsch (1905) saw two in Iceland in May that were very conspicuous, chasing the females of the Common Eider about and terrorizing both the old and young males of that species.

**VOICE.** The male's spring call is similar in character to the remarkable note of the male Common Eider. It has the same dovelike quality, and is described as a cooing sound of only two to four syllables, but not so loud or excited as the Common Eider's (Hantzsch, 1914). W. S. Brooks (1915) describes it rather differently, as a peculiar noise coming in a series of three syllables, *urrr-urrr-urrr*, the last being the loudest, "a sort of drumming call, as when one expels air forcibly through the mouth with the tongue lightly pressed against the palate." Hagerup (1891) spoke of it as a single cooing sound, heard often at night.

The female has a hoarse call, *gak-gak-gak* and an alarm-note apparently a little different. This alarm-note van Oordt (1921) described as like *cock-cock* or *croo-croo*.

The trachea is very similar to that of the Common Eider and has no special enlargements except the *bullæ osseæ* at the lower end. This has a shape almost the same as in the latter species but somewhat smaller, and there is apparently no enlargement of the left bronchus (Yarrell, 1886).

**FOOD.** Perhaps no other duck has had a wider range of animal food found in its crop than this one. Although resembling that of the Common Eider it seems to be even more variable, so far as one can judge from the stomachs that have been analyzed. Besides shells of many sorts, they are fond of crabs, shrimps, sea-cucumbers, sea-urchins, starfishes, marine worms, bryozoans, amphibians, various water insects and occasionally small fish and fish spawn. In both salt and fresh water, a good deal of vegetable matter is taken. W. Thompson (1851) mentions a specimen shot in Belfast Bay in winter that was filled with crustaceans and mollusks. Collett (in Dresser, 1871-81) reports specimens taken in winter in northern Norway as full of mollusks, some more than an inch in diameter, of the species *Pecten islandicus*, *Cyprina islandica* and *Mytilus modiola*. According to Winge (1899) specimens taken in Greenland contained the mollusks *Trophon craticulatus*, *Turritella polaris*, *Pecten islandicus* and *Mitra groenlandica*. He quotes Fabricius as having found *Mytilus edulis*, *Modiolaria laevigata*, *M. faba*, *Saxicava* and *Leda minuta*, young of the sea-urchin, snails and "corals."



The food habits of the duck are well illustrated in the Pribilof Island area by a series of forty-four well-filled stomachs studied by W. L. McAtee. The nature of the food is very like that found in the Common Pacific Eider for the same region only the King Eider takes fewer mollusks and a much lower percentage of starfishes, making up for it by a greater consumption of barnacles and fishes. The proportions were as follows: mollusks 34.36%; crustaceans 28.2%; sea-urchins, 9.54%; starfishes, 2.59%; and algæ, 9.88%. There were other items of food of lesser importance but of a good deal of interest and these included remains of fishes, barnacles, marine worms, hydroids, bryozoans, sea-spiders and foraminifera. The favorite animal food was the common blue mussel but a large number of other species of shells were identified (Preble and McAtee, 1923). Other stomachs in the collections of the U.S. Biological Survey from various regions show that the dominant food is the common mussel.

During the summer it is evident that a variety of fresh-water animals and plants are taken. Le Roi (1906-07) mentions besides, the usual stalks of *Gramineæ* and the leaves of phanerogams. In northeastern Greenland Manniche (1910) reports them as feeding in summer principally on plants, but also taking insects, especially the larvæ of gnats. In the stomachs of downy young he found remnants of undetermined crustaceans, plants and small stones.

The autumn food in fresh water is well shown by the results of a careful analysis of the stomach of a specimen shot in late November on the Seneca River, New York. The crop and stomach contained two fish (johnny darter, *Boleosoma nigrum*), two leopard frogs (*Rana pipiens*), three whirligig beetles (*Gyrinus*), sixty-seven fresh-water shrimp (*Gammarus fasciatus*) and a small snail (*Planorbis*). The gizzard contained remains of a frog, beetles and water-boatmen, crustaceans, a few mollusks and undetermined aquatic vegetable matter (Embrey, 1910).

Very unusual food for a duck was found in the stomachs of King and Pacific Eiders taken on the Pribilofs in January, December and May. These were found to have eaten at least four species of bryozoans, namely, *Crisia*, *Menipea pribilofi*, *Myrionozoum subgracile* and *Cellepora surcularis* (Osburn, 1921).

Stomachs taken from four birds shot at Montauk Point, Long Island, New York, in February, contained large quantities of a snail (*Trivia trivittata*), young black mussels, two or three mud-crabs and one sand-crab of the species *Cancer irroratus* (Whitfield, 1894). Norton (1900) found in the stomachs of specimens shot in April off the coast of Maine young holothurians (*Pentacta frondosa*). O. W. Knight (1908) found the same food but said that mussels were the principal items.

It has been remarked that males upon the breeding grounds eat almost nothing and grow very thin, while the less restless female retains her layer of fat.

COURTSHIP AND NESTING. The courtship of the King Eider is described by W. S. Brooks (1915) as follows: "On June 14 when approaching a small lagoon but still



unable to see it owing to a slight elevation of the tundra before me, I heard a strange sound on the other side of the elevation. This peculiar noise came in series of three: *urrrr-urrr-URRR*, the last being the loudest, a sort of drumming call as when one expels air forcibly through the mouth with the tongue lightly pressed against the palate. I had heard this noise once before during the winter made by an Eskimo and used with indifferent results for encouraging his dog team. I thought this call was an invention of his own at the time, but when in sight of the lagoon I found that the disturbance came from a small flock of King Eiders, three females and five males. They were on the beach and three males were squatted in a triangle about a female, each about a yard from her. They did much neck-stretching as many male ducks do in the spring, and frequently bowed the head forward. The males constantly uttered the above drumming note. During this time the female was very indifferent to the attentions of her suitors, doing nothing more than occasionally extending her head toward one of them. After a brief period of these tactics, one or more of the males would enter the water and bathe vigorously with much bowing of heads and stretching of necks, to return to the beach in a few moments and repeat the foregoing performance. Finally they all took wing uttering the croaking sound similar to the Pacific Eider."

They often pass along the north coast of Alaska in large flocks before the shore ice has broken up (Murdoch, 1885), usually apparently before the main flights of the Common Eider. As soon as the ice begins to melt on the tundra pools and lakes they scatter over their breeding grounds, but fresh eggs are seldom found before the 25th of June, although McIlhenny is said to have taken eggs at Point Barrow as early as June 15 (*fide* Millais, 1913). The usual nesting season extends from the last days of June through July (A. T. von Middendorff, 1853; von Bunge and von Toll, 1887; Trevor-Battye, 1895; Birulia, 1907; Manniche, 1910; Hantzsch, 1914; van Oordt, 1921; Jourdain, 1922; L. Gibson, 1922). It should not be surprising if the nesting time was really earlier than the above dates would indicate, for the return flight of males sometimes begins at an extraordinarily early period, even late June.

I have spoken before of the King Eider's flying inland a short distance to nest. They choose situations on small fresh-water ponds, on the islands or banks of these and sometimes on dry tundra well back from the water. It seems that they seldom if ever nest on outlying islands or in colonies of the Common Eider. So far as known they never go many miles inland, though Trevor-Battye (1895) found nests on Kolguev five or six miles from the sea, and Hantzsch (1914) found the species breeding in large numbers on and about the south shore of the great Kennedy Lake, in Baffin Land.

The nests, which are rarely close to each other, are mere hollows, often well concealed between tussocks, on flat, thickly vegetated islands, low places near rivers or even on the steep banks of lakes (Birulia, 1907; Hantzsch, 1914).



The clutch is about the same as that of the Common Eider and rarely exceeds five or six eggs, the average being four or five (Hantzsch, 1914; van Oordt, 1921; Manniche, 1910). Bunge (1883) mentions several clutches of seven eggs, but these must certainly have been exceptional. The eggs are the same color and shape as those of the Common Eider, but average somewhat smaller. Seventy-six eggs collected by Hantzsch in Baffin Land average 64.4 by 42.2 mm., the largest length and breadth being 70.4 and 45.6, and the smallest 60.3 and 39.8 mm., respectively (Hesse, 1915). Sixty-seven eggs measured by Goebel and Jourdain average somewhat larger (Millaud, 1913). The down is smaller and darker than that of the Common Eider (Manniche, 1910; Bunyard, 1917).

The incubation period has not been determined. On many breeding grounds the females stay with the young about the fresh water, especially where there are large lakes, as in Baffin Land. On Kennedy Lake they stayed until the end of August, and Hantzsch (1914) noted that second clutches were very rare. Van Oordt (1921) made similar observations in Spitzbergen.

The males begin to flock very early in the summer, even by the first of July. Well before the end of July they have all left the females and performed a regular migration to some safe moulting place on the sea. These males wear the breeding plumage until late into the summer, some showing little change until late July or early August, others beginning to go into eclipse by the second week of July. It seems certain that the breeding males do not lose the wing-feathers until very late in the summer, in late August or in September. The adaptation which allows these males plenty of time to make their tremendous journeys back from the breeding places at just the time when most males of other species of ducks are in full moult is a most interesting one. Were it not for some such provision many would certainly be caught in the ice and starved before they could reach open water.

**STATUS.** In view of its far-northern breeding grounds little is seen of the King Eider except on migration. It is probably much more common than the amount of published information would indicate.

The multitudes on migration described by almost all travelers on the Arctic coasts of Siberia, Alaska and Canada, besides the hosts that winter in southern Greenland give some idea of its abundance. W. S. Brooks has often told me of the enormous flocks (males and non-breeding females?) which he saw at Cape Serdze, Siberia, flying east on July 16. He said there were millions. The great spring flights near Nome, Alaska, are described as an almost constant succession of flocks following one another so closely as to form a continuous procession for hours at a time for the first week or ten days of the flight (G. A. Hill, 1923). Murdoch (1885) said that "thousands hardly describes the multitudes which passed up during the great migrations," notably in May and in July and August, at Point Barrow. Even as far



east as Cape Bathurst, Stefánsson (1913) saw vast numbers flying west early in July. On the morning of July 11, he says, for about three hours a large flock would pass every few minutes, sometimes four or five flocks in sight at once. At this time only one flock in ten were Common Pacific Eiders.

In the vicinity of Cumberland Sound, Kumlien (1879) found a hundred Common Eiders to one King Eider, but the natives told him that the numbers varied greatly from year to year. In the interior about the lakes, it is a very common breeder, as Hantzsch (1914) found. In the northern parts of Hudson Bay, Low (1906) found it very common, especially about the Livingstone Islands and on the east side of Roe's Welcome, and Sverdrup (1904) says that in King Oscar Land it is plentiful, though less common than the ordinary Eider. The breeding grounds in the extreme north of Greenland are not well known, but Manniche (1910) found it a far commoner nester in the extreme north of eastern Greenland than the Common Eider. Huge flocks we know winter in southern Greenland (Holböll, 1846; Hagerup, 1891).

The species is hardly more than a straggler in Iceland, though occasional summer invasions of non-breeding birds have been recorded (Hantzsch, 1905). In Spitzbergen it is very likely that considerable numbers nest, as recent records show. We know that on Kolguev it was found to be the commonest breeding duck next to the Long-tail, which exceeded it in the ratio of twenty to one (Trevor-Battye, 1895). Along the Arctic coast of Siberia the species is found on thousands of miles of coast where the Common Eider, it seems, is entirely absent.

**ENEMIES.** The enemies of this species are the same as those of the Common Eider. It may be that their nesting in the interior exposes them more to the depredations of the fox. Von Bunge and von Toll (1887) found that on the New Siberian Islands foxes and gulls destroyed many nests and van Oordt (1921) says that on Spitzbergen he found young ones whole in the stomachs of the Arctic Skua.

**DAMAGE.** None.

**FOOD VALUE.** Since this Eider spends a good part of the summer on fresh water (at least the females and young do) its flesh is far more palatable than that of the sea-going Common Eider. Even the eggs are said to be better tasting than those of the Common Eider (von Nordenskiöld, 1882). The Eskimos of Cumberland Sound consider the lump of fat at the base of the bill a special delicacy (Fabricius, 1780). Speaking of the Eskimos of Point Barrow, Murdoch (1885) says: "They are very fond of the fat which adheres to the skin, scraping it off with their knives industriously till not a particle remains, licking their knives with great relish. The intestines, boiled by themselves, are also considered a great delicacy."



HUNT. The hunting of the Eider has been dealt with at some length in connection with the preceding species. Since the King Eider is less timid about crossing land he is shot in great numbers by the natives of the Arctic. Nelson (1887) says that in Alaska the Eskimos kill many with slings, and use the skins for clothing. The skin of the female is split down the back, and the head, legs and wings removed to make an article of footwear used inside the sealskin boots. Speaking of the region about Point Barrow, Murdoch (1885) gives the following spirited account: "When the birds are flying at Pergniak, it is quite a lively scene, as there is a large summer camp of Eskimos close to the point where the ducks cross when the conditions are favorable. When the wind is east or northeast, and not blowing too hard, the birds come from the east and strike the land at a point which runs out on the shore of the bay about half a mile from Pergniak, close to where the lagoons begin.

"They would be apt to turn and fly down these lagoons were it not for a row of stakes, set up by the natives, running round the semicircle of the bay to the camp. As soon as the flock reaches this critical point, all the natives, and there may be fifty of them on watch with guns and slings, just at the narrowest part of the beach above the tents, immediately set up a shrill yell. Nine times out of ten the flock will waver, turn to follow round the row of stakes and naturally whirl out to sea at the first open place, where of course the gunners are stationed. With a strong wind, however, the ducks do not follow the land, but come straight on from the east and cross wherever they happen to strike the beach, so that the shooting cannot be depended on.

"The flocks during the fall flight are not so large and do not follow one another in such rapid succession as in the spring, and though they arrive from the east in the same stringing order, they huddle into a compact body as they whirl along the line of stakes and out over the beach.

"The natives, although as a rule they are far from good shots, are provided with poor guns, and appear particularly averse to putting in enough powder and shot to kill a strong Eider duck, nevertheless succeed in capturing a good many with guns and slings. They reap a plentiful harvest of them in the spring, when they are all at home and the crews of the whaling umiaks out at the open water spend their leisure time while they are waiting for whales in shooting ducks, which form an important article of food."

Holböll (1846) says that in Greenland the natives spear more of these than of the Common Eider, from their kayaks, and a still older writer, Fabricius (1780) gave a vivid description of the Eskimos surrounding a flock of moulting King Eiders and tiring them out until they could kill them with oars and sticks.

BEHAVIOR IN CAPTIVITY. So far as I have learned no specimens of this interesting duck have ever been kept in zoölogical collections.



HYBRIDS. Crosses between this and the Common Northern Eider have been several times recorded (Leverkühn, 1890; Millais, 1913). Van Oordt (1921) when in Spitzbergen saw a male King Eider mated with a female of the Common Eider.







*SUBFAMILY OXYURINÆ*







### SUBFAMILY OXYURINÆ

THE members of this group are often called Spiny-tailed Ducks because of the conspicuous long stiff shafts of the tail-feathers, the bases of which are but little concealed by the very short feathers of the rump. They resemble the Fuliginæ in having the hind toe provided with a large flaplike lobe. Most of them are small ducks and all are freshwater species. Although certain of the Ruddy Ducks extend their range to the cold-temperate lands of America and Eurasia, most of them are rather sedentary and are chiefly confined to the warmer parts of both hemispheres. The obvious external peculiarities of the four genera recognized are summarized by Salvadori (1895) as follows: —

- A. Bill nearly half the entire length of the head; chin without a pendent fleshy lobe; tail-feathers less than twenty-four.
  - a. Nail of the bill perpendicular.
    - b. Tail shorter than tarsus.....*Thalassornis*
    - b'. Tail longer than tarsus.....*Nomonyx*
  - a'. Nail of the bill bent inward; tail-feathers eighteen.....*Oxyura*
- B. Bill less than half the length of the entire head; chin with a pendent fleshy lobe; tail-feathers twenty-four.....*Biziura*







## WHITE-BACKED DUCK

*THALASSORNIS LEUCONOTA* EYTON

(Plate 83)

### SYNONYMY

*Thalassornis leuconotus* Eyton, Monograph Anatidæ, p. 168, 1838.

*Thalassiornis leuconotus* G. R. Gray and Mitchell, Genera Birds, vol. 3, p. 626, pl. 169, fig. 1, 1844.

*Clangula leuconotus* Smith, Cat. South African Mus., p. 37, 1837 (*nomen nudum*);  
Illustr. South African Zool., Aves, pl. 107, 1846.

*Anas brevipennis* Lichtenstein, *fide* G. R. Gray, Genera Birds, Appendix, p. 28, 1849.

*Thalassiornis leuconota* Lichtenstein, Nomenclator Avium, p. 103, 1854.

*Thalassornis leuconota* Bonaparte, Comptes Rend. Acad. Sci. Paris, vol. 43, p. 658, 1856.

*Erismatura leuconota* Monteiro, Proc. Zool. Soc. London, p. 89, 1865.

*Biziura leuconota* Schlegel, Mus. des Pays-Bas, Anseres, p. 8, 1866.

*Anas leuconotus* Giebel, Thesaurus Ornith., vol. 1, p. 355, 1872.

Additional synonymy under Geographical Races.

### VERNACULAR NAMES

*English*: White-backed Duck, White-rumped Diving Duck, Yellow-necked Widgeon,  
Yellow-throated Diving Duck, White-backed Stiff-tailed Duck.

*German*: Gelbhalsige Tauchente.

*Dutch*: Witrug Eend.

*Kaffir*: Battinu.

*Madagascan*: Tafiotra, Andrandra, Adáladála, Beloha, Maheriloha, Menamolotra,  
Danamona, Menamoulti.

### DESCRIPTION

ADULT MALE: "Upper part of the head, nape, and throat black, varied with yellow-ochreous; a buffy white spot at the anterior part of the cheeks just near the base of the bill, extending to below the gape; sides of the head ochreous yellow, with black roundish spots; sides and anterior part of the upper neck uniform bright ochreous yellow; back, scapulars, and wing-coverts with black and rufous-ochreous bands; rump white; upper tail-coverts black, with buff bands; under parts ochreous yellow, the jugulum, sides of the breast and flanks banded with black, the black bands broader on the flanks; centre of the breast uniform, unspotted; abdomen and under tail-coverts dusky, the edges of the feathers buff; primaries greyish brown, the secondaries spotted with rufous on the edges; under wing-coverts brown-grey, the marginal ones tinged with buff; axillaries buff, with a brown stripe along the middle; tail feathers blackish brown, with narrow ochreous edges" (Salvadori).



Iris dark chocolate-color. Bill: upper mandible black or blue-black, irregularly mottled with flesh-color along the cutting edge. Legs and feet black (Uganda specimens, J. C. P., collector).

Wing 160–180 mm.; culmen 38–45; tarsus 35–41 (measurements of African examples).

Weight of specimens shot in April at Lake Chahafi, southwestern Uganda, 1 pound, 8 ounces to 1 pound, 12 ounces (0.68 to 0.79 kilograms).

**ADULT FEMALE:** Similar to the male. Size slightly smaller. Wing about 155 mm.

**IMMATURE SPECIMENS:** Lower side browner, less ochreous, and with the black markings much more obscure. Mantle and scapulars more uniform-looking and with black and ochreous bands not well developed. Shafts of tail-feathers bare at the tips.

**YOUNG IN DOWN:** The most marked characteristic and one which separates this species from the young of the genus *Oxyura* (Ruddy Ducks) is the presence of broad white patches on the wing-rudiments, scapulars and sides of the rump, as well as on the flanks. These young are light brown above and pure white below, the two colors not merging, but sharply defined from each other. The sides of the head are white except for a post-ocular brown band which runs back and merges with the brown color of the occiput and top of head. The forehead is white except for a narrow point of brown which extends down almost to the culmen (specimen in British Museum, Lake Karenga, Ankole, Uganda; W. S. Daggett, collector).

## DISTRIBUTION

THE White-backed Duck is a widely distributed but rather rare African species, whose range extends from the Cape to Abyssinia and Loango, as well as to Madagascar. Like most African ducks it is essentially non-migratory and may be found at any season in most parts of its range.

The northernmost limit of its range is southern Abyssinia, where a specimen was shot on Lake Cialalaka in February (Salvadori, 1888). Von Erlanger (1905) met with the species on the lower Ganale River in Somaliland and discovered it nesting on Lake Harrar in southern Abyssinia. To the south, specimens have been taken in Ankole, Uganda, in December (Ogilvie-Grant, 1905a) and near Kagezi in November (Reichenow, 1887). I found a large colony at Lake Chahafi, extreme southwestern Uganda, in the spring of 1924. In British East Africa (Kenya) it appears to be moderately common about Lake Naivasha. Specimens have been taken there in February, April, August, October and December (W. Stone, 1906; G. H. Gurney, 1909; V. G. L. van Someren, 1922). In what was formerly German East Africa, Sjöstedt (1910) met with the species about the Natron Lakes in July, September, April and May. He says it was common in the two latter months. Several naturalists have seen or taken it in Zanzibar (G. A. Fischer and Reichenow, 1878; Böhm, 1882). Stuhlmann (*vide* Reichenow, 1900) took specimens on the neighboring coast in Usaramo in February, and in the interior in Irangi in June. In the southwestern parts it appears to be of regular occurrence for Böhm (*vide* Reichenow, 1900) met with it at Igonda and in Ugalla, Matschie (1887) has recorded it from Genda and Karema and Kothe (1911) found it, though rare, in southern Ufipa in February and at Mkulwe in October.

In Mozambique specimens have been taken at Quiliniene in January (Reichenow, 1889) and on the upper Shiré River on Lake Malombe in June (Hartert, 1898). On the west side of Lake Nyassa this duck has been recorded from Lake Shirwa (Shelley, 1896–1912), Zomba (Shelley, 1899) and Namaramba (Shelley, 1901). As yet there are no records of its occurrence in northern Rhodesia, but E. C. Chubb (1908) has reported specimens from the Kana River, Matabeleland, taken in November, while to the westward it seems to be quite common on the pans of north-western Bechuanaland (Nicolls and Eglington, 1892; Bryden, 1893; Fleck, 1894).

De Rochebrune (1883–85), a notoriously unreliable observer, long since recorded this species from





MAP 103. Distribution of White-backed Duck (*Thalassornis leuconota*)  
Sporadic record indicated by cross (X)







the Senegambian region of western Africa. His testimony has been ignored by later writers, and justly so. Yet we must confess that we know very little of the northern limit of the species in western Africa, for Bouet (1914) has recorded a specimen from Bodjocali on the upper Niger in northern Dahomey, and this is hundreds of miles north of what was previously the northernmost record. Barboza de Bocage (1877-81) has recorded the species from Benguela and Mossamedes in Angola while Andersson (1872) and Fleck (1894) found it rare in what was formerly German Southwest Africa, excepting at Omanbonde and Ondonga.

In South Africa the White-backed Duck is widely distributed but generally rare. From the Transvaal it has been recorded from the vicinity of Potchefstroom (T. Ayres, 1874) and the Pretoria district in April (Hellmayr, 1902). Nicolls and Eglington (1892) found it near Mafeking. Haagner (1902) found it nesting at Modderfontein in the Transvaal in April. According to Millar (in Stark and Sclater, 1906) these ducks nest from November to February near Durban in Natal. E. A. Butler, Feilden and Reid (1882) found nests in the Newcastle district of Natal in September and October. In the Orange River Colony the White-backed Duck has been recorded only from Kroonstad (Symonds, 1887) but in Cape Colony it has been found in various localities. C. G. Davies (1908) found it not common in August in East Griqualand, and at Port Elizabeth it is rare (Brown, *vide* Stark and Sclater, 1906). A few pairs were seen on the Kleinemonde River near Grahamstown (Paget-Wilkes, 1924). It has been taken three times in the vicinity of Capetown (E. L. Layard, 1875-84; Stark and Sclater, 1906).

In Madagascar the White-backed Duck is a resident species, uncommon but met with throughout the island (Hartlaub, 1877; Milne-Edwards and Grandidier, 1876-81; Sibree, 1892; Richmond, 1897; Bangs, 1918).

### GENERAL HABITS

In habits the White-backed Duck of South and East Africa seems closely to resemble the other stiff-tailed ducks. It is very secretive and spends its time in the inaccessible open spaces of reed-beds and *vleis*, less commonly also on rivers and pans. It is probably less scarce than generally believed. Nicolls and Eglington (1892) tell of gentlemen who shot over the Vaalpens Pan in Bechuanaland for six years and never obtained any of these ducks. Yet when these writers forced their way through the thick grass with a canvas boat they had no difficulty in killing eight at one shot. On Lake Ngami they found the species frequenting the open waters "simply in thousands." In many other regions recent observers have found it far from rare. It might better be described as extremely local in its distribution. I was impressed with this fact in southwestern Uganda where on the many wild-fowl lakes of the Kagezi district I saw it only on one sheet of water, Lake Chahafi. There it was really abundant and I could watch it at leisure through a glass from my tent door.

**WARINESS.** In districts where it is unmolested this duck is usually classed as far from shy. Von Erlanger (1905), writing of southern Abyssinia, says they could easily be approached to within thirty or forty paces, and Böhm (1885) says the same of what was formerly German East Africa. In the Kilimandjaro region Sjöstedt (1910) says they are very bold and will not always fly even when one or more of their



number have been shot. In Madagascar, too, it is very tame and is known as Adáladála or the "Foolish One" because it does not fly until one is very near it and consequently is easily shot (Sibree, 1892). On the other hand G. H. Gurney (1909) found it a very shy bird about Lake Naivasha. This is much more in keeping with my experience at Lake Chahafi in extreme southwestern Uganda where I hunted for a couple of days in the spring of 1924. So far as I know these ducks were seldom disturbed there except by the occasional visits of the District Commissioner and yet they were so shy that I was hard put to it to collect a series of specimens. They usually rose out of gun-shot and were the hardest of all the ducks to get excepting only the African Pochards. They always made for the center of the lake when disturbed among the lily-pads and never tried to escape by diving unless they were wounded.

**DAILY MOVEMENTS.** This duck does not, so far as I know, ever fly of its own accord in daylight hours. It never at any rate goes across land except at night.

**SWIMMING.** Sjöstedt (1910) notes that on the water this duck looks very stupid and lazy and Davies (in B. Horsbrugh, 1912) writes that the tail is carried flush with the surface. Both these naturalists, as well as Böhm (1885), von Erlanger (1905) and Haagner and Ivy (1908), have remarked on their habit of swimming low and, when alarmed, of submerging entirely excepting for the eyes. In other words they behave much like other ducks of this group. Among my notes on this duck I remarked their low-sunk postures when alarmed, the neck and head extending straight up and the tail submerged. But I saw others which were not aware of my presence, and they sat for long intervals very quietly among the thick pads where they were hard to see. Now and then one preened the feathers of the flanks and while doing this it spun around and around as on a pivot with its tail cocked up.

**DIVING.** Field naturalists are unanimous in classing this duck as one of the most expert divers. It usually resorts to this means of escape and can go down without causing a ripple (Davies, in B. Horsbrugh, 1912). Nicolls and Eglington (1892) say that it can cover fifty to sixty yards under water. In my short acquaintance with it I never saw one dive unless wounded and I believe they must get a good deal of food from the surface vegetation which was very rich in the lake where I found them.

**FLIGHT.** When disturbed, those that I saw in Uganda flew out from the shore vegetation to the center of the lake. For twenty or thirty yards they "walked" along the surface uttering an oft-repeated whistling squeak. After that they flew low for another fifty yards or so, the body held at a marked angle, until they finally straightened out into a horizontal position and got their legs tucked up against their



tails. The wing-arc seemed large, for the wings were strongly depressed and elevated in spite of the rapid beating. The white rump-patch makes a very prominent field-mark which shows up at long distances in flight.

Some observers have found this species very loath to take wing and say that when alarmed it invariably dives. Some indeed seem never to have seen it in the air (J. H. Gurney, 1862; Böhm, 1885; von Erlanger, 1905; Sjöstedt, 1910; Davies, in B. Horsbrugh, 1912; V. G. L. van Someren, 1922).

Ordinarily these birds are seen in pairs or in small groups of four or five, but Sjöstedt (1910) says that on occasion rather large flocks are seen.

ASSOCIATION WITH OTHER SPECIES. Nothing has been written on this point. In Uganda they were in waters occupied by large numbers of Great Crested Grebes, African Little Grebes, African Moorhens and Black Crakes.

VOICE. I can find absolutely no information about the voice with the exception of the casual remark made by Davies (in B. Horsbrugh, 1912) that during flight they utter their "curious whistling note." I described this call in my own notes as an "oft-repeated whistling squeak." It is loud enough to be heard at least several gunshots away but whether it is confined to one sex or uttered by both sexes I do not know. Nearly all these stiff-tailed divers are remarkably silent and not even the females, so loquacious in most ducks, seem to have any voice.

I found several points of interest in the trachea. There is no asymmetrical *bullae ossea* in the male but a bony plate about the width of the trachea extends from the insertion of the tracheal muscles down to the bifurcation. It is formed by the fusion of at least twelve rings and is a simple elongated box, slightly keeled on its ventral surface, and one-half to five-eighths of an inch long. The two topmost rings are somewhat accentuated. This region is quite different in the female. The lower third of her trachea is smaller in diameter and practically simple. That is, there is at the lower end of the trachea only a very small bony structure formed by the fusion of from two to four rings. It is possible that we have in this species a beginning stage in the sex differentiation of the male trachea. Or it may be that the tendency to secondary sex characters has manifested itself in another structure as it has in the Ruddy Duck and the Musk Duck.

FOOD. We have practically no information respecting the food. J. H. Gurney (1862) states that they eat chiefly the seeds of water plants and Hellmayr (1902) reports that a specimen shot on the Pienaars River had grass and seeds in the stomach. The few which I shot in the spring of 1924 were full of decomposed vegetable matter and very small flattish brown-colored seeds some two millimeters in diameter. They contained also a great deal of very fine grit but I found no remains of animal life on casual inspection.



COURTSHIP AND NESTING. The courtship of this bird has never been described. As with all semi-tropical species the nesting season is extraordinarily variable. In South Africa, eggs have been taken in November, December, February and April (Haagner and Ivy, 1908). In East Griqualand, Davies (in B. Horsbrugh, 1912) found a nest and eggs on April 3, while in Natal nests have been found in September, November, December and February (E. A. Butler, Feilden and Reid, 1882; Millar, in Stark and Sclater, 1906). J. H. Gurney (1862) found young in Natal in August. In the north V. G. L. van Someren (1922) took a female with an egg in the oviduct on April 15 and he tells me it was recently found breeding at Lake Naivasha, Kenya, in February. I feel quite certain that in southwestern Uganda these ducks were breeding at the beginning of the rains in early April, 1924, for I shot only one female out of the series which I took at Lake Chahafi. Von Erlanger (1905) says that specimens taken in June in southern Abyssinia had but slightly developed organs.

The nest is invariably placed just above the surface in thick reeds growing in water two or three feet deep. Like the nests of other stiff-tailed ducks it resembles a Coot's nest, consisting of trampled-down rushes, usually arched over (E. A. Butler, Feilden and Reid, 1882; Stark and Sclater, 1906).

The ordinary clutch seems to number about three to five eggs (Millar, in Stark and Sclater, 1906) though Davies (in B. Horsbrugh, 1912) found one nest with seven eggs and J. H. Gurney (1862) gives four to eight as the size of the clutch. There is a good deal of discrepancy in the descriptions of the eggs. Those taken by E. A. Butler, Feilden and Reid (1882) are described as rough, granulated and of a pale greenish white, measuring 65.0–66.0 mm. in length and 51.0 mm. in breadth. This would tally well enough with the descriptions of eggs of related species, but the eggs taken by Millar (in Stark and Sclater, 1906) and Davies (in B. Horsbrugh, 1912), while they agree as to measurements, are perfectly *smooth* and *glossy* and of a warm brown or warm rufous color, which does not fit any other species of the stiff-tailed family. No one has ever actually seen the female on the nest, but both Butler and Davies state that she slips off like a grebe, a habit characteristic of all the Ruddy Ducks as well as the Musk Duck.

In this species, too, the size of the egg is exceptionally large in comparison with the size of the bird. This has given rise to various superstitions among the Madagascan natives. Sibree (1892) quotes a Mr. W. Wilson as follows: "The natives tell me that the female bird experiences some difficulty in the laying of her eggs, which are very large in proportion to the size of her body. Indeed, the passage of the egg is said to make the bird faint and become unconscious." If found just at this time she may be taken off her nest with the hand. So, on account of this supposed feminine weakness, the bird is *fady*, or tabooed by all native women, who think that they might experience a similar difficulty in child-birth were they to eat its flesh.



The incubation period is unknown, but during this time the male evidently remains in the vicinity of the nest and he is said to assist the female in the care of the young (J. H. Gurney, 1862).

STATUS. I have already quoted Nicolls and Eglington (1892) in regard to the abundance of this species in certain localities in South Africa and have ventured the opinion that it is probably less rare than is generally supposed. E. A. Butler, Feilden and Reid (1882) found it common in Natal and Davies (in B. Horsbrugh, 1912) says it is not rare in East Griqualand. In the Natron lowlands, Sjöstedt (1910) found it very numerous in the rainy season and V. G. L. van Someren (1922) describes it as common about Lake Naivasha. Where I found it in the Kagezi district of Uganda it was plentiful but very local. I estimated at least 150 on the small Lake Chahafi which could not have been much over a mile and a half or two miles long.

ENEMIES AND DAMAGE. Nothing especial recorded.

FOOD VALUE. The flesh is oily and fat and generally regarded as unpalatable (Nicolls and Eglington, 1892; Stark and Sclater, 1906). Still Haagner and Ivy (1908) state that at times they are not bad and Sibree (1892) quotes a certain MacKay who, in Madagascar, found them "generally fat and plump and very good eating." I tried several shot on Lake Chahafi where there was a great abundance of rich vegetable food and found them fat and fairly well flavored, not very different from other ducks taken on the same waters. Most of the ducks of this group leading sedentary lives in warm countries take a great deal of coarse animal matter and grow strong in flavor, but evidently there is no general rule for the White-backed Duck.

HUNT. Nothing recorded. I found them difficult ducks to shoot from a native dugout, getting up at long ranges and flying out to the middle of the lake. By drifting down-wind upon them and "bottling" them into some cove it was possible now and then to get good close shots, for they would always make direct for open water when flushed from the lily-pads or reed-fringed edges.

BEHAVIOR IN CAPTIVITY. So far as I know this species has never been kept in confinement either in Africa or in Europe. Judging by its general nature it would probably be very difficult to handle.

#### GEOGRAPHICAL RACES

IN 1897 Dr. C. W. Richmond noticed that White-backed Ducks from Madagascar were markedly different from those on the continent of Africa and he gave them the rank of a full species with the name *insularis*. The Madagascan birds are, however, obviously only an island form of *Thalassornis leuconota* and I think it is more in keeping with modern tendencies to accord them subspecific rank only, as follows:



## AFRICAN WHITE-BACKED DUCK

THALASSORNIS LEUCONOTA LEUCONOTA EYTON

*Clangula leuconotus* Smith, Cat. So. African Mus., p. 37, 1837 (*nomen nudum*).*Thalassornis leuconotus* Eyton, Monograph Anatidæ, p. 168, 1838.

CHARACTERS: See under description of species.

RANGE: Continental Africa, south of the Sahara.

## MADAGASCAN WHITE-BACKED DUCK

THALASSORNIS LEUCONOTA INSULARIS RICHMOND

*Thalassornis insularis* Richmond, Proc. U.S. Nat. Mus., vol. 19, p. 678, 1897.

CHARACTERS: Similar to *T. leuconota leuconota* of Africa but much smaller; crown more intense black and abdomen darker. Black markings everywhere more intense and the buff color of the sides of the head, neck and breast paler and grayer.

Wing 135–150 mm.; culmen 32–37; tarsus 32–36 (series in Museum of Comparative Zoölogy).

RANGE: Madagascar.





MASKED DUCK

Imagure Male

Adult Female

MADAGASCAN WHITE-BACKED DUCK

Adult Male

Adult Female







## MASKED DUCK

*NOMONYX DOMINICUS* (LINNÉ)

(Plate 83)

### SYNONYMY

*Anas dominica* Linné, Systema Naturæ, ed. 12, vol. 1, p. 201, 1766.

*Anas spinosa* Gmelin, Linné's Systema Naturæ, ed. 13, vol. 1, pt. 2, p. 522, 1789.

*Fuligula dominica* Stephens, General Zool., vol. 12, pt. 2, p. 203, 1824.

*Cerconectes spinosa* Wagler, Oken's Isis, p. 282, 1832.

*Erismatura dominica* Eyton, Monograph Anatidæ, p. 172, 1838.

*Oxyura dominica* Eyton, Monograph Anatidæ, pl. 24, fig. 2, 1838.

*Erismatura spinosa* Gosse, Birds Jamaica, p. 404, 1847.

*Erismatura ortygoides* "Hill," Gosse, Birds Jamaica, p. 406, 1847.

*Dendrocygnus spinosa* Brewer, Proc. Boston Soc. Nat. Hist., vol. 7, p. 308, 1860.

*Biziura dominica* Schlegel, Mus. des Pays-Bas, Anseres, p. 9, 1866.

*Nomonyx dominicus* Ridgway, Proc. U.S. Nat. Mus., vol. 3, p. 15, 1880.

### VERNACULAR NAMES

*English:* Masked Duck, Black-masked Duck, Dominican Duck, White-winged Lake Duck, St. Domingo Teal, Spinous-tailed Duck, Squat Duck.

*German:* Masken Ente, Dominikanische Ruderente.

*French:* Sarcelle à queue épineuse, Sarcelle de Cayenne, Sarcelle de la Guadeloupe, Sarcelle rousse à longue queue, Vingeon.

*Spanish:* Pato chorizo, Pato dominica, Agostero, Patocito, Pato chico, Buza, Patury, Cau-cau, Pato sierro, Pato espinosa.

*Portuguese:* Marrequinha.

*Dutch:* Gemaskerde Roeieend.

### DESCRIPTION

**ADULT MALE:** Fore part of head, lores and cheeks black; chin with a white spot (? always). Remainder of head and neck rusty red to cinnamon color, the same color carried down on to the mantle, where the feathers have black centers. Scapulars like the lower mantle, the feathers having broad rusty edges and prominent black centers. Back, rump and upper tail-coverts gray-black, more or less barred with rusty. Tail black; tail-feathers very long. Upper breast like neck, shading into whitish on the rest of the lower parts, often stained buffy or reddish. Wings nearly uniform grayish brown with a conspicuous white speculum formed by some of the outer wing-coverts and all but the tips of the outer secondaries. Primaries very dark brown, nearly black. Under wing brown, axillars white.

"Bill blue; nail, tip of both mandibles, and naked skin on chin black; remainder of the lower mandible reddish white; outer aspect of tarsus and two outer toes dark brown or black, the inner side of the tarsus, inner toe, and membranes pale brown, spotted with black; iris dark brown; naked skin around the eyes bluish" (Gundlach).



Wing 135–140 mm.; bill 33–35; tarsus 26; tail 95–100.

Specimens in full plumage are rare in collections.

**ADULT FEMALE:** Top of head black fading out into a brown-streaked appearance on the occiput and hind neck. This black cap is bordered on each side by a prominent buffy streak running from the bill over and back of the eye. Below this again is a wide black stripe from the bill through and below the eye. A wide buffy stripe separates this from the second black streak which runs from the gape across the cheeks to and beyond the aural region. Remainder of head buff, shading into darker colors on the neck. Mantle and scapulars nearly black, barred with light-buffy edges to the feathers. Back, rump and upper tail-coverts dark gray indistinctly barred with light gray; tail black. Under parts and flanks very similar to those of male; wing with a large white speculum like the male's.

Bill horn brown with the tip black (Gundlach).

Wing 135 mm.; bill 33; tarsus 26–28.

**MALE AND FEMALE IN FIRST (JUVENAL) PLUMAGE:** Very similar to adult female and with the face-pattern well developed. The upper parts are nearly the same as in the adult female but the lower neck, upper breast and flanks are nearly uniform and lack the black centers and light edgings to the feathers of those parts. The shaft of the tail-feathers is bare for 10 or 20 millimeters and terminates in a hair-like branching tip. The sexes are the same at this stage.

**IMMATURE MALE:** At first as above, changing into a plumage which seems to be very difficult to tell from that of the adult female. Specimens which have moulted the first tail- and wing-feathers seem to stay for a time in such a plumage, although the throat is inclined to be a little more ruddy than it is in the other sex. Later on, broad ruddy-edged feathers come in on the mantle and scapulars, the red extends up on to the back of the head and the prominent face-pattern becomes gradually obscured by dark feathers filling in the buff-colored areas. It seems likely that the full plumage is not assumed until about two years old, although the time limits are doubtless very variable. A series of fourteen specimens, mostly from Cuba (Museum of Comparative Zoölogy) illustrates the very gradual change to maturity.

**ECLIPSE OR POST-BREEDING PLUMAGE OF ADULT MALE:** It is possible that this species loses its brilliant coloring during the post-nuptial moult, just as the Ruddy Duck does.

**YOUNG IN DOWN:** Not examined.

## DISTRIBUTION

THE real home of the Masked Duck, a rather rare American species, is in the West Indies and the neighboring lands of South and Middle America. While not a true migratory species, it shows a marked tendency to stray from its regular range, just as the Ruddy Ducks do.

The northernmost record of its occurrence is for Vermont, where, at Alberg Springs, Lake Champlain, a specimen was shot on September 26, 1857 (H. D. Morse, 1858). Other specimens  
**Northern** plain, a specimen was shot on September 26, 1857 (H. D. Morse, 1858). Other specimens  
**Records** have been taken at Malden, Massachusetts, August 27, 1889 (Cory, 1889a) and at Elkton, Maryland, September 8, 1905 (Houghton, 1906) as well as near Madison, Wisconsin, in November, 1870 (Brewer, 1872). The only other record for the United States is of one taken and several seen just north of Brownsville, Texas, on July 22, 1891 (A. K. Fisher, 1895). Grayson (G. N.  
**Mexico** Lawrence, 1874) reports having seen about fifty near Tepic in western Mexico and  
**Central** Sallé took specimens at Jalapa, Vera Cruz (P. L. Sclater, 1857b, 1860a). Recently  
**America** Nordhoff (1922) has reported meeting with the species on Lake Chapala, Jalisco. No specimens have been recorded from Guatemala, Honduras or Nicaragua, though one from Guate-





MAP 104. Distribution of Masked Duck (*Nomonyx dominicus*)  
Sporadic records indicated by crosses (X)







mala is listed in the British Museum Catalogue. In Costa Rica several have been taken: on the Laguna de Sierepe and near Cartago (Cherrie, 1893), on the Laguna de Coris and at Las Concovas (Carriker, 1910). In Panama specimens have been taken at Veragua (P. L. Sclater and Salvin, 1876), at Laguna de Pita (Salvadori and Festa, 1899) and at Miraflores Lake (W. Percy).

In the West Indies the Masked Duck is probably resident in all suitable localities. In Cuba it is generally distributed and breeds (Gundlach, 1875; Barbour, 1923) and the same is true of Grand Cayman (English, 1916) and Jamaica (Bangs and Kennard, 1920). It nests also in northern Santo Domingo (A. E. and A. H. Verrill, 1909) and presumably in Porto Rico (Gundlach, 1874; Wetmore, 1916). Throughout the Lesser Antilles specimens have been taken on St. Croix (A. and E. Newton, 1859), Guadeloupe (G. N. Lawrence, 1879; Ballet, 1895), Dominica, Martinique, Barbados and Trinidad (P. L. Sclater, 1862a; Léotaud, 1866; U.S. Biological Survey).

The range of the Masked Duck in South America is very extended, but it is not common and our information is so meager that no real idea of its status can be given. F. M. Chapman (1917) found the species not common in the Cali valley, Colombia, in January, but on the Rio Cogollo and Lagunillas in Venezuela, Osgood and Conover (1922) found it very common in March and May. The species has also been found in all three parts of Guiana (C. Chubb, 1916; C. B. Dawson, 1916; F. P. and A. P. Penard, 1908-10; von Berlepsch, 1908). On the west coast it has been found in Ecuador on the Rio Peripa and at La Carolina (Salvadori and Festa, 1900; Lönnberg and Rendahl, 1922), in Peru at Sarayacu and at Eten (British Museum; C. Chubb, 1919), and on Lake Titicaca as well as near Caiza, Bolivia (British Museum; Lönnberg, 1903). Two specimens, taken near Concepcion, Chile, in June and September, 1894, have been recorded by Schalow (1898). In Brazil this duck appears to inhabit all parts, for it has been recorded from the Rio Negro and Matto Grosso in the interior as well as from the Provinces of Pará, Pernambuco, Bahia and São Paulo (von Pelzeln, 1868-71; Goeldi, 1894-1900; H. and R. von Ihering, 1907). It has also been met with in Paraguay (Bertoni, 1913) and is said to be common in Uruguay (Barrows, 1884). It is a rare bird in the Argentine, but specimens have been taken in Tucuman (Lillo, 1902) and Entre Rios (W. B. Lee, 1873) and it has been found nesting in Buenos Aires Province (A. H. Holland, 1892; Hartert and Venturi, 1909). Evidently this is the southern limit of the range.

### GENERAL HABITS

THIS little tropical representative of the Ruddy Duck or stiff-tailed group is one of the most inconspicuous of all ducks. Living, as it does, in waters covered with dense vegetation and seldom trusting to its wings it is scarcely ever noticed, even by the most careful field naturalists. Usually it is collected only by a special effort and by some native who knows its habits and haunts. One of the remarkable things about the Masked Duck is its tendency to stray thousands of miles north of the regular boundaries of its range, differing in this way from other tropical species such as the Bahama Duck and various Tree Ducks.

**WARINESS.** This duck is of a very retiring disposition though by nature somewhat confiding and trusting. Lord William Percy (in Barbour, 1923) says that in Cuba they are far less shy when the water in the lagoons is high and they are less in danger of attack, and Dr. Barbour himself tells of an exceptionally tame pair which he watched along the railroad. In northwestern Venezuela Osgood and Conover (1922) also found them tame, and P. H. Gosse (1847), speaking of Jamaica, says that



they would come very near the road, though if any move were made by the observer they were quick to take alarm. On Grand Cayman, English (1916) found them rather more wary than other fowl, but this, he admits, is not saying much in a place where all birds were exceptionally unsuspicious.

**DAILY MOVEMENTS.** These are day-feeders, like all other ducks of this type. They do not fly from place to place except at night.

**GAIT.** This bird rarely if ever goes on land, and when it does so it probably crouches, as described by Hill (in P. H. Gosse, 1847). According to Léotaud (1866), when out of the water it stands erect, the tail touching the ground.

**SWIMMING.** Several naturalists have noted that on the water it swims very low, the tail being held erect and spread, slightly inclined toward the head (A. and E. Newton, 1859, p. 367; A. H. Holland, 1892). English (1916) says that when merely resting on the water they float like most water-fowl, the water-line being in about the usual place; but when swimming "they are almost always deeply submerged, and if approaching or receding from the observer, seem to have a relatively enormous 'beam.'"

**DIVING.** The Masked Duck is just as consummate a diver as the Ruddy, and ordinarily attempts to escape in that way rather than by flight. Barrows (1884) says they spend at least half their time under water and that they will dive at the flash of a gun. The method by which they "slide" under is very interesting, and has been well described. P. H. Gosse (1847) says: "If they suspect danger, they gradually sink wholly under water; and if suddenly alarmed they thus immerse themselves in a moment, not diving as other water birds do, but sinking as they sit, causing scarcely a ruffle of the surface." He states that they will stay under an incredibly long time, "even for several hours, unless they can manage to expose the nostrils to the surface without appearing." English (1916) describes their action in a similar way: "It has the appearance of being done without the movement of a muscle, just as if the bird were a leaking vessel which was going down on an even keel." It is scarcely necessary to add that no duck can stay actually submerged more than a minute or two and these little fellows are probably exceptionally clever at rising with only the bill out of water and going down again without leaving a ripple to tell the tale.

**FLIGHT.** The Masked Duck seems to be less averse to flying than the Ruddy, at least when both birds are living side by side in tropical waters. But like its relatives it will usually dive rather than take wing. Lord W. Percy (in Barbour, 1923) was told that in late summer and autumn, when the water in some of the Cuban lakes is



higher and the surface vegetation less dense, they are not so secretive and will fly about a good deal of their own accord, especially early and late in the day. He says his experience elsewhere did not suggest that they were difficult to flush, though they rarely flew farther than the nearest patch of cover. In Panama, Percy (*in litt.*) has seen them fly from a hundred to two hundred yards. P. H. Gosse (1847) also says that they occasionally fly or rather flutter with much flapping of wings across the pond, splashing the surface as they go. He saw one take a higher flight across the road. A. and E. Newton (1859, p. 367) seems to have had little difficulty in flushing them.

These birds rarely form in large companies. Usually single birds or a pair are seen (A. H. Holland, 1892), but parties of three to six are not uncommon (Barrows, 1884), and Osgood and Conover (1922) mention seeing ten to twenty together in north-western Venezuela.

**ASSOCIATION WITH OTHER SPECIES.** As a general rule this bird does not associate much with any ducks except the Ruddy and with them only over the northern part of its range. Nevertheless, Barrows (1884) says that in Uruguay it is seen in the company of grebes, coots and gallinules, occupying of course exactly the same sort of nesting and feeding grounds required by these species.

**VOICE.** The call of the Masked Duck is very distinctive, says William Percy (in Barbour, 1923), the male's note being a *kirri-kirroo, kirri-kirroo, kirroo, kirroo, kirroo*; the bird will respond like a cock Pheasant to such noises as the banging of a punt-pole on the water or an explosion in the distance. The female, he says, makes a short hissing noise, repeated several times. Other notes have been attributed to it (see English, 1916).

The trachea, as described by von Pelzeln (1868-71), has no bony box at the bifurcation, but for a distance of about one inch at the upper end the trachea itself is enlarged.

**FOOD.** What little is known of the food of the Masked Duck points to its being almost entirely of a vegetable nature. P. H. Gosse (1847) and von Pelzeln (1868-71) found seeds in the stomachs of specimens killed in Jamaica and Brazil. Gundlach describes the diet as consisting of seeds of grasses, roots, tubers, insects and small crustaceans. In Panama, W. Percy (*in litt.*) found them feeding on "wild flax." Stomachs from birds collected by him in Cuba contained nothing but vegetable matter. One had two hundred and fifty seeds of *Polygonum hydropiperoides* (a smart-weed), eight of *Fimbristylis* (a rush), 1 of *Cuscuta* (dodder) and four unidentified. Another contained 140 seeds of the same *Polygonum*, 12 of *Fimbristylis*, 1 of *Cuscuta* and two unidentified. The third contained 260 seeds of *Polygonum*, 1 of *Castalia* (water-lily),



1 of *Cuscuta*, and 1 of *Cladium effusum* (twig-rush) as analyzed by the U.S. Bureau of Biological Survey.

It seems remarkable that these ducks, with habits so like those of the true Ruddies, should feed so exclusively on vegetable matter, for all the tropical and southern-hemisphere Ruddies are notoriously fond of animal food.

COURTSHIP AND NESTING. The display of this species has never been described, which is not to be wondered at, considering the secretive nature of the bird and the difficulty of watching it in the inaccessible reed-beds.

The breeding season is exceedingly variable. In Panama and Cuba it is generally known as *Pato agostero* and it is said to nest in August (W. Percy, *in litt.*). In reality the specimens taken by Percy in Panama appeared to have been hatched in January, and some of those taken in Cuba (now in the Museum of Comparative Zoölogy) in January are about four or five months old. Gundlach gives November as the nesting month in Cuba. In the Argentine Hartert and Venturi (1909) report a nest taken on September 18, and A. H. Holland (1892) says they nest in Buenos Aires Province in early November. There is little likelihood of a clear-cut period of breeding over the hotter parts of its range. The one taken in Vermont in September was moulting its wing feathers.

Very few actual nests have ever been found, but they are evidently similar to those of the other stiff-tailed ducks. A. H. Holland (1892) describes the location as among the rushes of which the nest is constructed, with hardly any lining.

The clutch is small, probably never exceeding six eggs. In Panama they are said (W. Percy, *in litt.*) to lay five or six, and the nest is reported to contain no down! Gundlach gives the number of eggs as six or more, but A. H. Holland (1892) says they lay only three eggs and the nest recorded by Hartert and Venturi (1909) contained only four. The eggs themselves are described as white in color, very rough and very round (A. H. Holland, 1892). Hartert and Venturi (1909) describe them as yellowish white, measuring 50–51 by 37–39 mm.

The incubation period is unknown, nor have we any information regarding the behavior of the male at and after that time.

STATUS. Some idea as to the status of this species has already been given. In suitable localities it is unquestionably more common than is generally supposed. Both Gundlach and W. Percy consider it more numerous in Cuba than the Ruddy, and English (1916) found it "more or less abundant" throughout the year on Grand Cayman. In northwestern Venezuela, Osgood and Conover (1922) found it very plentiful early in May, and exceeded in number only by the Gray-breasted Tree Duck (*Dendrocygna discolor*). Barrows (1884) describes it as abundant on the pools of the Uruguayan pampas, though farther south, in Buenos Aires Province, it is rare (A. H. Holland, 1892).



ENEMIES. Dr. Barbour (1923) says that in some of its favorite localities in Cuba, the mongoose, introduced from Jamaica, "now fairly swarms." "The mongoose is no swimmer," he continues, "but creeps about the floating islands of willows and plays havoc with many ducks' nests."

DAMAGE. None.

FOOD VALUE. Léotaud (1866) describes the flesh of this bird as excellent, and Barbour (1923) says that when sent to the market it is highly prized. Considering the nature of its food this duck should be excellent eating, in spite of diminutive proportions. I should guess that it can scarcely weigh more than half to two-thirds of a pound.

HUNT. Writing of Cuba, Dr. Barbour (1923) says: "During the dry season at Lake Bacuranao, not far east of Havana, they are hunted with dogs which are taught to catch the birds, loath to leave their haunts even when low water strands the floating vegetation which gives such excellent refuge when well afloat." No doubt the small size of the bird serves as a protection to some extent. Alfred Newton (A. and E. Newton, 1859) gives a good idea of their behavior when stalked by him in St. Croix: "On June 15th I all but succeeded in getting a shot at some five or six of these ducks, and had another good view of them. The lagoon on which I found them is nearly divided into two unequal portions by a low point which juts out from one side of it: about half-way along this spit of land I placed myself, squatting down among the mangroves, while I sent the lad who was with me round to the other side to try and drive the birds within shot of me — they being then about the middle of this portion of the pond. He arrived at the spot I had pointed out opposite to me, and disposing his garments in graceful folds about his head and shoulders, walked into the water, which he found to be nowhere above four feet in depth. The Ducks thereupon ceased feeding, and collected together, but did not seem for a time ill-disposed to be driven my way, merely keeping some eighty yards in front of him, as he waded and they swam across. Suddenly they stopped, swam to-and-fro for an instant or two; and I felt sure they had divined my presence, probably by getting wind of me. In another moment they were up: away they went, flapping along the surface; and as they rounded the point towards the other part of the lagoon I lost sight of them. I still lay quiet, hoping they might come round; but they did not do so, nor could I discover whither they had gone."

BEHAVIOR IN CAPTIVITY. So far as I know this species has never been kept in confinement in the United States or in Europe, but P. H. Gosse (1847) quotes at length from a letter written him by a certain Mr. Hill, who kept one on a pond in a



flower-garden in Jamaica. Hill writes in part: "I shall not venture to say how far similarity of structure in the tail of the Erismaturine family of Ducks with that of the Cormorant, indicates a similarity in the application of this organ for diving purposes, as Mr. Eyton has conjectured; but a bird kept in a small pool in a flower garden, into which pond-weeds were daily thrown, particularly *chara* and duckweed, (*pistiaceæ*) upon which it was supposed to feed, would lead me to think that one important purpose that this remarkably constructed organ was applied to, was to move aside the dense vegetation of shallow pools in which it fed. The habit of this bird was to turn round quick. By this motion it opened out the weeds on the surface, so graphically described by Shakspeare as 'the green mantle of the standing pool,' — and made a clear space for 'swithering with its neb,' as Lincolnshire decoy-keepers would say. It dived frequently, and the period it remained submerged was prodigiously long. It swam backward as frequently as forward, and, I apprehend, found its peculiarly made tail a powerful lever in dilating the space behind it. The little garden, in which the bird was kept, that furnished me with these observations, was a fair representation of its natural haunts. Tufts of flowers, composed of lilies, kincalmias, and Indian-shot, with intermixtures of young vegetating bananas, were an apt substitute for the heliconias, nymphæas, cyperaceæ, juncales, and marantaceous plants, among which it delighted when wild and at large. It sometimes crept on the bank, and sheltered itself among the bowery herbage; but the clots of damp weed, strewn around its pond, were its favourite resting place when out of the water; and there it sat *crouching*, not sitting upright as the Grebe does. In its natural haunts it is occasionally flushed, but its flight is exceedingly short, not usually more than from the bank into the mantling herbage of the pond, where it instantly disappears in those long submersions I have already noticed."



# WHITE-HEADED DUCK

*OXYURA LEUCOCEPHALA* (SCOPOLI)

(Plate 84)

## SYNONYMY

- Anas leucocephalus* Scopoli, Annus I. Nat. Hist., p. 65, 1769.  
*Anas mersa* Pallas, Reise Russische Reichs, vol. 2, appendix, p. 713, 1773.  
*Anas hyberna* Gerini, Storia Uccelli, vol. 5, pl. 577, 1776.  
*Anas vindila* Pennant, Gen. Birds, p. 65, pl. 13, 1781.  
*Anas viduata* Latham (in part), General Synopsis, vol. 3, pt. 2, p. 525, 1785.  
*Anas ruthenica* Hollandre, Abrégé d'Hist. Nat., Oiseaux, p. 243, 1790.  
*Aythya mersa* Boie, Oken's Isis, p. 564, 1822.  
*Oidemia leucocephala* Stephens, General Zoology, vol. 12, pt. 2, p. 218, 1824.  
*Platypus leucocephalus* Brehm, Lehrbuch Naturg. Europ. Vögel, vol. 2, p. 824, 1824.  
*Fuligula leucocephala* Bonaparte, Annals Lyceum Nat. Hist. New York, vol. 2, p. 391, note, 1826.  
*Aythya leucocephala* Brehm, Oken's Isis, p. 993, 1830.  
*Erismatura leucocephala* Bonaparte, Sagg. Distr. Met., agg. e corr., p. 144, 1832.  
*Cerconectes mersa* Wagler, Oken's Isis, p. 282, 1832.  
*Undina leucocephala* Gould, Birds Europe, vol. 5, pl. 383, 1837.  
*Oxyura unifasciata* Eyton, Monograph Anatidæ, pl. 24, fig. 1, 1838.  
*Erismatura mersa* Bonaparte, Comparative List, p. 59, 1838.  
*Undina mersa* Keyserling and Blasius, Wirbelthiere Europa's, pp. lxxxvi, 229, 1840.  
*Bythonessa leucocephala* Gloger, Gem. Hand- u. Hilfsbuch, vol. 1, p. 472, 1842.  
*Fuligula mersa* Degland, Ornith. Europ., vol. 2, p. 476, 1849.  
*Erismatura* (?) *unifasciata* Bonaparte, Comptes Rend. Acad. Sci. Paris, vol. 43, p. 652, 1856.  
*Biziura leucocephala* Schlegel, Mus. des Pays-Bas, Anseres, p. 11, 1866.  
*Oxyura leucocephala* Hartert, Vögel d. Paläark. Fauna, vol. 2, p. 1373, 1920.

## VERNACULAR NAMES

- English:* White-headed Duck, Stiff-tailed Duck, White-faced Duck, Spiny-tailed Duck, Spanish Duck, Ural Duck.  
*German:* Ruderente, Weissköpfige Ente, Kupferente, Fasanente, Dornschwanzente, Uralische Ente, See-Ente, Nymphenente.  
*French:* Erismature leucocéphale, Fuligule couronnée, Canard à tête blanche, Canard Sauki, Canard nymphe.  
*Czech:* Kachna belohlavá.



*Dutch:* Stekelstaarteend, Witkopeend.

*Italian:* Gobbo rugginoso, Anatra d'inverno, Anatra della testa bianca, Tistuni, Anitra muscarunis, Mascaruneddu, Titillonaxiu, Capuccinu, Stama d'acqua, Anari de Spagna.

*Spanish:* Pato tarro, Pato porrone, Porron.

*Russian:* Savka sinonossaia.

*Polish:* Kaczka bialoglova.

*Croatian:* Norka kršuljica.

*Hungarian:* Kékcörü récze.

*Kirgish:* Achpass iruck.

*Arabic:* Boroba.

*Maltese:* Braimla rasha bajda.

### DESCRIPTION

**ADULT MALE:** Crown black; all the rest of the head white. Neck black, fading into a rusty-gray color in the center of the mantle, and chestnut on the sides of the mantle, the feathers crossed with fine irregular, black lines. Back and rump gray, with indistinct blackish barring, merging into the chestnut-colored upper tail-coverts. Tail black, the feathers long and stiff as in other members of the genus. Lower neck and breast chestnut like the sides of the mantle, this color continued down the sides and on to the flanks where it loses some of its ruddy tinge. The color of the breast merges gradually with the silvery-white or silvery-buff color of the abdomen and under tail-coverts, but the gray color at the base of the feathers shows through more or less. Wing without a speculum, gray in color, and vermiculated on the coverts and secondaries with whitish buff. Under wing-coverts mostly gray; axillars white.

Iris dark brown. Bill swollen at base, bright light blue (pure ultramarine according to Danford and Harvie-Brown, 1875), this color fading very rapidly to a brownish gray and ultimately to a dark lead color. Feet ashy brown to plumbeous with the webs black.

Wing 155–165 mm.; bill 46–47.5; tarsus 34–37.

**ADULT FEMALE:** “Differs from the male in lacking the clear white on the head and in being much more rufous, especially on the underparts; crown, nape, and cheeks brown-chestnut, with blackish bars; a white streak below the eye, from the base of the bill nearly to the nape; chin, throat, and sides of the neck just near the head whitish, dotted or streaked with blackish on the sides of the neck; upper tail-coverts scarcely deeper chestnut than the remainder of the upper parts: bill dull plumbeous; iris dark brown; legs plumbeous black” (Salvadori, 1895).

Size slightly smaller; wing 150–155 mm.

**IMMATURE MALE:** Very similar in plumage to the old female, according to Salvadori, only somewhat more ruddy on the back.

**YOUNG IN DOWN:** Very similar in general appearance to the young of the American Ruddy Duck (*Oxyura jamaicensis*) and of nearly the same color as that species on both the upper and the lower side. The cheeks, however, instead of being gray, are covered with a dark-brown patch, leaving a narrow whitish line under the eye from the bill to near the ear. The sides of the neck are grayish, like the chin. It also differs from the Ruddy Duck in having no prominent white dorsal patches. In some cases, too, the lower parts are not nearly so light-colored as in that species.





WHITE-HEADED DUCK  
Male

Female

RUDDY DUCK

Male







The upper side is dark brown, except the top of the head which is nearly black. The brown of the upper side merges gradually into the light gray of the lower parts. White body-spots absent. Under the eye and running back until it merges with the gray at the sides of the neck is a prominent white streak. Below this and covering all the upper part of the face is another broad streak or patch of brown, almost as dark as the crown patch. The chin is white and the lower neck and breast pale brown (specimens in British Museum and Tring Museum).

### DISTRIBUTION

THE real home of the White-headed Duck is the Mediterranean basin. Its migrations seem to be very local, conditioned perhaps by the water and food supply, though individuals stray far from their regular range.

In northwestern Africa the species is said by de Rochebrune (1883-85) to occur rarely as far south as the Senegambia region, but the observations of this investigator can hardly be accepted. What we do know is that it is a common nesting bird in northern Morocco and that it winters there too (H. and A. Vaucher, 1915; Hartert and Jourdain, 1923). In Algeria it probably nests everywhere in suitable localities. At least on the lakes of northeastern Algeria a number of observers (Salvin, 1859; Tristram, 1860; Zedlitz, 1914) have found it breeding. Tristram (1860) saw some as far south as the northern Sahara. There is no actual proof of its nesting in Tunis, though it probably does so; in winter it is moderately common in the regency (J. I. S. Whitaker, 1905; Millet-Horsin, 1912). Africa

There is no satisfactory record of the occurrence of this species in Portugal, although it appears with a question-mark in de Seabra's list (1910). In Spain it is a local breeder in Andalucia, particularly in the *marismas* at the mouth of the Guadalquivir (H. Saunders, 1871; A. Chapman and Buck, 1910). Some spend the winter in southern Spain (H. Saunders, 1884). Spain

The White-headed Duck has occurred several times in France, but that country can hardly be included in the regular range. I find records for Beziers on the Mediterranean coast, January 28, 1876 (Lacroix, 1876a) and for the Camargue, where, according to l'Hermitte (1916) it occurs sporadically. There are further records of its capture near Grenoble (Degland and Gerbe, 1867) and near Dieppe and Cotentin in Normandy (Gadeau de Kerville, *vide* Paris, 1911). In Belgium the species has been taken once near Antwerp, October 28, 1911 (Havre: Rev. Soc. Ornith. Centr. Belg., June, 1912), but there are three records from Holland, as follows: 1859, near Rotterdam; November 22, 1874, near Oostzaan, North Holland; November 23, 1913, near Kampen (van Oort, 1922). In Germany, White-headed Ducks have been reported seen in Schleswig (Kjærbölling, 1850), Thuringia (Schalow, 1910) and in Silesia (Kolibay, 1906), but all these records are very old and are not substantiated by specimens or definite localities (Hildebrandt, 1923). France  
Holland  
Germany

In Switzerland this duck has been taken about six times, chiefly about Lakes Constance and Zürich (Fatio, 1904). In northern Italy it is rare, hardly more than accidental, in fact. Specimens have been taken in all the Provinces, and nesting birds were found about the Lago di Lesina and about Barletta, Apulia, while in Sicily this duck is resident throughout the year, breeding particularly about Lentini and Catania (Giglioli, 1886, 1889-91; Arrigoni degli Oddi, 1904). Specimens have been taken in Corsica, and it is probably safe to assume that small numbers nest there (J. Whitehead, 1885; Jourdain, 1911), for in Sardinia the species is resident and breeds (Salvadori, 1865; Bonomi, in Giglioli, 1889-91). In Malta it is very rare indeed, and cannot be regarded as more than a straggler (C. A. Wright, 1864; Despott, 1917). Switzerland  
Italy

In Jugo-Slavia this species occurs rarely and chiefly on passage in Dalmatia (von Mojsisovics, 1886; Kolombatović, 1903), while in Herzegovina it is very rare (Reiser, 1895). In the present-day territory of Austria specimens have been taken in the Tyrol and in Lower Austria, especially in Neusiedler See (von Mojsisovics, 1886). Specimens have been taken in Moravia (von Mojsisovics, 1886), and in June not uncommonly in eastern Galicia (Prazák, 1898). In 1853, a Balkan  
States



female and young were taken near Budapest (von Mojsisovics, 1886) and Lendl (1895) records specimens observed near Gárdony, Hungary, in July, 1895.

In Rumania the White-headed Duck nests regularly in Transylvania in small numbers, especially on the Mezöseger ponds (Danford and Harvie-Brown, 1875; A. von Brehm, 1879a, p. 334; von Mojsisovics, 1886). Small numbers also nest about the mouth of the Danube (Reiser, 1894). In Bulgaria, so far as I know, none has ever been found breeding, though specimens are not infrequently taken in winter (Reiser, 1894). According to Powys (1860) it is resident and common in northwestern Greece, about Butrinto and Prevesa (Nicopolis), but elsewhere in Greece it is described as very rare by von der Mühle (1844) and Lindermayer (1860).

The White-headed Duck is tolerably common in winter in the Nile delta, up as far as Cairo, but  
**Egypt** there is no satisfactory evidence of its breeding there (Shelley, 1872; von Heuglin, 1873;  
**Asia** Nicoll, 1919). Its status in Palestine is about the same (Tristram, 1884). Specimens  
**Minor** have been seen in Cyprus in winter (Bucknill, 1911) and the species has been recorded  
 from Asia Minor by Krüper (*fide* Braun, 1908).

Very probably small numbers breed all along the coasts of the Black Sea. Radde (1884) speaks of a few wintering in the Crimea, but Valkh (1911) says it nests about Ekaterinoslav and Czernay (1852)  
**Russia** states that it is rather common about Charkow. On the lower Volga it is a common  
**Turkestan** breeding bird from Astrakhan up to Kamyshin (latitude 50° north), according to See-  
 bohlm (1882), Moeschler (1853) and Suschkin (1914). Russki (1893) states that sporadically the species has wandered as far as Kasan. The Kirgis steppes probably form the greatest breeding area of this duck, the northern limit being perhaps 55° north latitude, though some evidently nest in the Urals as far north as Cheliabinsk and Shadrinsk (Henke, 1880; Nazarov, 1887; Suschkin, 1914). Eastward the breeding area extends over the whole of Turkestan, excepting the arid southwestern part (Lansdell, 1885; Menzbier, 1888; Smallbones, 1906) and thence north as far as the vicinity of Akmolinsk (Bianchi, 1902a) and Lake Chany (Finsch, 1879).

In the Caucasus the White-headed Duck is said by Seebohm (1883) to be resident, though Radde (1884) speaks of it only as a winter guest about Lenkoran and the southern Caspian. Dresser (1891)  
**Caspian** has recorded a specimen from Erzerum. Zarudny (1911) says that it winters on the  
**Regions** Caspian coast of Persia and that it is resident in the Seistan district, but Cumming (1905) speaks of it as very common there in winter and "probably" resident. In Mesopotamia it is rare (Ticehurst, Buxton and Cheesman, 1922). In Transcaspia it is common in winter (Radde, 1886; Loudon, 1910) and occurs in summer as well (Zarudny, 1889-90). Loudon (1910) met with it in Bucharra and Ferghana in April. Meinertzhagen (1920) states that in some winters the species is common in northern Baluchistan, while A. E. Ward (1907) speaks of it as not common but regular as  
**India** a winter guest in Kashmir. About Kohat and Kuram, C. H. T. Whitehead (1909)  
 found it very rare and this is true of the whole of northern India where it has occurred sporadically all the way from the Punjab, Srinagar, Delhi and Lucknow to Calcutta, where the species has twice been found in the Bazaar (Baker, 1921).

### GENERAL HABITS

THIS is a true member of the most curious group of ducks, the stiff-tailed or Ruddy Ducks. The present species is remarkable in many ways. It has a peculiar distribution across the south of Europe to India, that greatly resembles the range of the Marbled Duck. It is fond of dense, reed-covered ponds and it often ventures into brackish or even salt water. Like the other ducks of this genus it is apt to be more common in a given locality than may be supposed, for its habitat lends itself to concealment. Then, too, it never is seen flying about in the day-time like other ducks.





MAP 105. Distribution of White-headed Duck (*Oxyura leucocephala*)

Breeding range, dotted line; winter range, broken line  
Sporadic records indicated by crosses (X)







Several writers have gone so far as to say that it prefers salt water to fresh (von Heuglin, 1873; Irby, 1875; Radde, 1884). The truth is that it is happy anywhere in warm waters, where it does not have to move far in its daily search for a varied diet. It likes brackish lakes in Egypt.

**WARINESS.** This duck has the same sluggish nature as others of its genus. It is never easily flushed and trusts itself under water much more than above it. It must be classed as a tame, stupid duck, like our Ruddy, and more than likely it was at one time a much commoner species than it is now. Even when flushed it flies very low over the water and is just as apt as not to return to the intruder and circle about him (Zedlitz, 1914). It does not like to leave its home pond and will stand any amount of disturbance rather than risk a day flight to new haunts.

Finn (1915) mentions a live, but disabled bird purchased in the Calcutta Bazaar, which, in spite of its affliction, was so tame that it would plume itself while being held in the hand. Grebes, he adds, will act in this same way.

**DAILY MOVEMENTS.** I should certainly place this duck among the more or less nocturnal species, although there are very few good notes on its intimate habits. Von Heuglin (1873) found them in Egypt spending the day away from shore on broad salt waters. This can scarcely be called typical.

**GAIT, SWIMMING AND DIVING.** The White-headed Duck is never seen ashore, any more than our Ruddy Duck is. It has been said that the bird cannot walk, but this is more than doubtful. When swimming, the position is rather low, the tail is apt to be held perpendicularly and the feathers are spread out in a fan. When in this position it is very easy to pick out this duck at long distances in the field, the same as with our Ruddy Duck. The tail is always cocked up when the bird is alarmed and swimming away and also during display, but there are times when it is carried flat on the surface or even under water.

It is not very likely that this will be mistaken for any other species. It dives very readily, often preferring that method of escape. It has been credited with great powers of remaining under water (up to several minutes according to Naumann) but such a length for this or any other duck appears to me extremely unlikely.

**FLIGHT.** When once forced to rise, although it is much more likely simply to swim away from danger, it flies very fast and with extremely rapid beats of its short wings. It usually stays close to the water and circles about, only to plunge back not far from where it started. Although clumsy and noisy at getting under way, it attains a fair speed and has a sort of cormorant-like look with its long tail trailing out behind.

Flocks are usually rare, in fact, in most places only pairs and single birds are met



with, but bunches of nine and ten have been noticed in Transylvania (Danford and Harvie-Brown, 1875) while Herman (in Naumann, 1896-1905) saw groups of four to eight in what was formerly part of Hungary.

ASSOCIATION WITH OTHER SPECIES. A solitary and very unsociable bird, the Stiff-tailed Duck is almost never found with other kinds of ducks. It much prefers the company of Coots of different species and among these it feeds and even nests. I find mention of one place in Sardinia where it associated more or less with Tufted Ducks (Brooke, 1873). It uses the old nests of Coots to deposit its eggs in.

VOICE. No person seems to have given any good account of the voice of this duck and the trachea has not been described. Pallas, indeed, long ago gave some indication of a note (male or female?) which sounded like *cha cha* or occasionally like *sauka-ula*.

FOOD. There is no doubt about a large amount of animal food being consumed by this duck. It certainly never winters north of regions where such food would be abundant in fresh and brackish water. The diet includes small mollusks (both snails and bivalves), crabs, worms, insects, seeds and various vegetable matter (J. I. S. Whitaker, 1905; Zedlitz, 1914; von Heuglin, 1873; etc.).

COURTSHIP AND NESTING. Von Heuglin had something to say about the curious antics of this duck in the spring on Egyptian waters. In Corsica on the 7th of May, J. Whitehead (1885) watched two males and three females on the same pond. The males were rushing after one another, every now and then stopping short beside the females, and "hoisting their very peculiar tails straight in the air, spreading out every feather to its utmost, until the tails looked exactly like a hand with all the fingers spread out." These were no doubt, he says, nesting, as he saw them in the same spot on May 28.

Courtship has been noticed as late as June 22 to July 2 at Merv (Zarudny, 1889-90). I dare say this duck displays all summer, more or less, just as our Ruddy does. This must be a very silent duck as no writer has mentioned a note, even during courtship.

As to the nesting season it is extremely late, a characteristic of the group. Even in the warm regions where it lives, eggs are not found until June at the earliest. The season extends all through June and into July. In Hungary young have been reported as early as mid-June (Otto, in Dresser, 1871-81) but this is earlier than most records for Algeria (Zedlitz, 1914; Irby, 1875; and others).

So far as we know, the nest is always placed in reeds or rushes over water and is usually if not always floating (Moeschler, 1853). It utilizes old Coots' nests at times. Few nests have been accurately described.



The clutch is from six to ten although one of thirteen and another of fifteen have been mentioned (Zedlitz, 1914; Henke, 1880). The eggs are remarkable in several respects. They are large, very rough on the surface (as if sand were on them) and are dirty white to chalky white. Dried specimens are said to change color somewhat.

Measurements of seventy eggs averaged 66.35 by 50.7 mm. The maximum length was 71.4 and the maximum breadth 53.5 mm. The minimum length was 62.8 and the minimum breadth was 48 mm. We thus see that the eggs are extremely large for so small a duck. From Heinroth's (1922) calculations the weight of a clutch of eight is just about equal to the female's own weight. This proportional weight of eggs is only exceeded by the Golden-eye. The incubation period is not known but there are some stories to the effect that during the last half of incubation the female hardly sits upon her eggs at all (Naumann, 1896-1905). I have not been able to find the original observations upon which these statements are based. They are, however, more or less borne out by the experiments of Henke (1880) who took eggs and, after putting them in a bowl at room temperature, found that they kept as warm as if they had been incubated. Even extreme heat on the stove, where they were left several hours by mistake did not seem to affect them, for after more than a week all the eggs hatched, much to his surprise.

He found that the young were very wild; unfortunately they refused all food and died in two or three days. On preparing these for specimens he was struck by the thick layer of fat on their backs (at least one and a half millimeters). He supposed that this fat might have been formed in the embryo and served the purpose of keeping them warm in the egg. I think it is likely that the female slips off her nest at the approach of an intruder and is thus seldom seen on her eggs. Either this or the eggs do not require constant covering during the daytime, allowing the bird plenty of time for feeding.

The male is said to rejoin his family after the young are hatched. Indeed, it is most probable that he does not leave them at all, but remains with them until his moult, which is late in the season.

**STATUS.** This duck is nowhere really common and is scattered irregularly over its range in small colonies in suitable places. The center of its abundance is in Transcaspia and the Kirgis steppes. It seems never to be as common as the Marbled Duck or the Crested Pochard over any part of its curious range. Whether it was once a more plentiful species we do not know.

**ENEMIES.** According to an observation made by Captain Macnab (in Baker, 1921) this duck is well able to keep itself out of harm's way when pursued by a hawk. He described what he saw in India as follows: "As I approached, a hawk came on the scene and hovered over it, evidently imagining that it had found its breakfast;



and I sat down to see what would happen, and in order to watch the bird more intently before shooting it. What did happen was that whenever the hawk poised itself in the air preparatory to attacking, the duck dived under continually, and, on reappearing after some twenty or thirty seconds, immediately disappeared again keeping all the time very much in the same place.

“After some five minutes of this the hawk went off disappointed.”

**FOOD VALUE.** Radde (1884) thought that their flesh was very poor. It is reasonable to expect that an animal diet would damage their flavor. They are, however, very fat, and become remarkably so in the autumn.

Henke (1880) found that the natives of the Kirgis steppe region made a regular practice of taking their eggs and would eat them even though highly incubated. He adds that the Kalmucks would do the same were it not for their religious principles which prevent them from taking, not from eating the eggs.

**BEHAVIOR IN CAPTIVITY.** None has ever been kept in captivity.

**HYBRIDS.** None recorded.



## RUDDY DUCK

*OXYURA JAMAICENSIS* (GMELIN)

(Plate 84)

### SYNONYMY

*Anas jamaicensis* Gmelin, Linné's Systema Naturæ, ed. 13, vol. 1, pt. 2, p. 519, 1789.

*Anas rubida* Wilson, Amer. Ornith., vol. 8, pp. 128, 130, pl. 71, figs. 5, 6, 1814.

*Rhynchaspis jamaicensis* Stephens, General Zoology, vol. 12, pt. 2, p. 119, 1824.

*Rhynchaspis rubida* Stephens, General Zoology, vol. 12, pt. 2, p. 120, 1824.

*Fuligula (Oxyura) rubida* Bonaparte, Ann. Lyceum Nat. Hist. New York, vol. 2, p. 390, 1826.

*Cerconectes rubida* Wagler, Oken's Isis, p. 282, 1832.

*Erismatura rubida* Bonaparte, Comparative List, p. 59, 1838.

*Biziura rubida* Schlegel, Mus. des Pays-Bas, Anseres, p. 11, 1866.

*Erismatura ferruginea* von Frantzius (*nec* G. R. Gray), Journ. f. Ornith., vol. 17, p. 378, 1869.

*Erismatura dominica* Aiken (*nec* Linné), Proc. Boston Soc. Nat. Hist., vol. 15, p. 210, 1872.

*Erismatura jamaicensis* Salvadori, Cat. Birds British Mus., vol. 27, p. 445, 1895.

*Oxyura jamaicensis* Brabourne and Chubb, Birds So. America, vol. 1, p. 58, 1912.

### VERNACULAR NAMES

*English:* Ruddy Duck, Blue-bill, Booby, Booby Coot, Hard-head, Sleepy Broad-bill, Horse-turd Dipper, Bumble-bee Coot, Creek Coot, Spoon-bill, Broad-bill, Butter-ball, Batter Scoot, Sleepy-head, Fool Duck, Deaf Duck, Bull-neck, Goose Widgeon, Tough-head, Salt-water Teal, Pin-tail, Bristle-tail, Heavy-tail, Stick-tail, Spine-tail, Dun-bird, Hickory-head, Water Partridge, Paddy-whack, Leather-back, Hard-tack, Dumpling Duck, Diving Teal, Widgeon Coot, Shot-pouch, Chunk Duck, God-damn, Buck Ruddy, etc., etc.

*German:* Amerikanische Ruderente.

*French:* Le canard roux, Marteau.

*Spanish:* Pato floridano, Pato tepalcate, Gallineta de pantano, Pato espinoso, Pato chorizo, Pato zambullidor.

*Dutch:* Jamaica Roeieende.

*Creole:* Marteau.

*Mexican:* Atepalcatl, Yacatexoctli.



## DESCRIPTION

**ADULT MALE, BREEDING PLUMAGE** (not assumed until April): Top of head and nape black; lores, cheeks and chin white. Remainder of head and neck, as well as the mantle, sides, flanks and scapulars rich ruddy chestnut (or "chestnut rufous"), deeper on the lower neck and upper breast. Back and rump, dingy black shading into the red color of the upper tail-coverts. Tail black. Lower breast and all of abdomen and under tail-coverts bright silvery white, although the bases of the feathers, which are dark brown, often "show through." Lower parts very apt to be stained rusty, but in clean specimens they are pure white. Wing dark olive-brown without any speculum and with the greater coverts more or less "freckled." Under wing-coverts white, axillars white.

Iris hazel. Bill blue. Legs and feet bluish gray with the webs dusky.

Wing 142-154 mm.; bill 39-44; tarsus 31-36.

Weight 1 pound, 4 ounces to 1 pound, 8 ounces (0.56 to 0.68 kilograms) for birds in good condition (Harper).

**ADULT FEMALE (winter):** Top of head down to and below eyes dark brownish, minutely barred with black. Below this an indefinite whitish stripe from the bill to the occiput, with a darker band across the cheeks from the gape through the aural region. Rest of head whitish gray, darker on the back of the neck. Mantle, scapulars, back, rump and upper tail-coverts blackish, minutely freckled and more or less irregularly barred with gray-buff. Tail black. Lower parts silvery white like the male's with concealed dark bases of the feathers more or less showing through, this appearance depending on the wear of the feather-tips. Sides and flanks darker, with irregular banded appearance. Breast and abdomen often stained buff or rusty-reddish color. Wing as in the male.

Iris hazel. Bill blue or bluish. Legs and feet nearly as in the male.

Wing 135-145 mm.; bill 37-42; tarsus 30-34.

Weight somewhat less than male on the average.

**MALE AND FEMALE IN FIRST (JUVENAL) PLUMAGE:** Very like the adult female but mantle and scapulars not so dark, less barred and freckled, and of a duller brownish color. Tail-feathers with prominent bare shaft-tips, which often have the hair-like shafts of the downy tail-feathers adhering to their tips, and the tail itself often very faded and worn. Feathers around the neck retain their soft downy character for several months. Male and female not to be distinguished at this stage.

**IMMATURE MALE:** At first like female and remaining in this plumage for a relatively long time. Thus there may not be any apparent difference all through the autumn and early winter. Darker feathers with the light freckling come in during early autumn on the mantle and scapulars in both sexes, making them look (except for the curious tail which may even in October show the long hair-like terminations) almost exactly like the adult female. At the same time, or in most cases later, the face-pattern of the young male begins to be broken by white feathers, the forerunners of the male's white face-patch. These come first on and about the auricular region. There may be little change during the next month or two, but before spring the tail is usually renewed and new red feathers begin to appear among the scapulars or on the mantle. I am not certain just how soon the young male gets his final breeding plumage, but I am informed that this stage is not reached until mid-June, at a much later date than it is in the old male. As far as known the young male is ready to breed when a year old, although his red plumage is not perfect and is apt to be obscured by an admixture of darker feathers. The autumn or gray plumage is assumed at about the same time as it is in old males, and then the young male may be said to have assumed a fully adult stage of plumage. The tail undergoes a second moult at this time.



**ADULT MALE IN ECLIPSE:** A word of explanation is here necessary. The Ruddy differs from the other more typical diving ducks in the time of his plumage changes. In the fully adult male the brilliant red phase (nuptial plumage) is not complete until late March (earliest, March 18) or April (sometimes not until late May). Thus the male carries his eclipse plumage all the autumn and winter. It follows therefore that the plumage seasons are for him almost reversed because his full breeding dress is carried through the summer, from April or May to August or September (sometimes to October). The eclipse plumage is as follows: like the female but top of head darker and the white face-patch prominent in most cases, obscuring the "face-pattern" of the adult female. The whole upper side, particularly the mantle and scapulars, is much more like the juvenal, early-autumn plumage (either sex) than like the female. The mantle and scapular regions are rather finely striped and freckled and have not the irregular barred appearance of the fully adult female. The remainder of the plumage is like the adult female's.

It is not uncommon to see some old males with faded red feathers on the mantle or scapulars all through the autumn and winter, the remains of the old nuptial plumage. In others, the beginning of the new breeding plumage may appear as early as March. The tail moult is irregular in this duck. As a rule these feathers are renewed in the old males from February to April, but sometimes before this. The flight feathers of course are renewed in late summer as in other ducks. I have shot old males in mid-October (near Boston, Massachusetts) that were still red all over the upper parts so that assumption of full eclipse is probably often delayed until mid-autumn.

**ADULT FEMALE (summer):** The breeding female (July) is very dark all over, and in most cases is distinctly ruddy or rusty-tinted. There is, however, a good deal of variation in this respect. The banding and freckling of the lower mantle and the scapulars (winter) is lacking, and the lower parts, owing to the wear at the tips of the feathers, are indefinitely banded with dark gray. The tail is renewed during the late winter or early spring.

**YOUNG IN DOWN:** Dark brown all over the upper side, almost jet black on the top of the head and rump. The black of the head extends down to and a little below the eye and fades into the dark brown of the occiput and hind neck. On each side of the back is a prominent white spot, but there are no white marks on the wing-rudiments or rump. The rest of the face, chin and throat are a very pale-gray color except for a band, usually well defined, from the gape through and behind the ear, most prominent on the ear region itself. The upper breast and the sides of the breast are dark smoky gray; the remainder of the lower parts gray-white to pure white like the chin.

Iris dark brown; bill dusky, with the lower mandible yellowish; feet dusky olive.

## DISTRIBUTION

The Ruddy Duck, only North American representative of the spiny-tailed ducks (*Oxyurinae*), is widely distributed over North America. It is more of a migratory species than its Old World relative, the White-headed Duck, though it too shows a tendency to become resident and local in certain warmer districts, especially in the West Indies.

## BREEDING RANGE

In the Northwest the Ruddy has been seen and taken in summer on Kuprianov Island in southeastern Alaska (Willett, 1921), but there is no likelihood of its nesting there. In **Alaska** Canada it has been found breeding as far north as Fort Resolution on Great Slave Lake, **Canada** and specimens have been seen or taken at Fort Providence and at Fort Rae (Preble, 1908). Farther south Mr. Francis Harper, while collecting for me on the western end of Lake Athabasca, found it nesting in very small numbers at Egg Lake, northwest of Fort Chipewyan. In British



Columbia the Ruddy nests as far north as the Cariboo region (A. Brooks, 1903; R. MacFarlane, 1908) and small numbers undoubtedly nest in Alberta, at Buffalo Lake and Burnt Lake, for example (Dippie, *vide* J. and J. M. Macoun, 1909). In Saskatchewan it is a somewhat more common breeding bird, and nests have been found in a number of localities, chiefly in the southern part (R. MacFarlane, 1908; J. and J. M. Macoun, 1909; Raine, 1892; Bent, 1907). The species used formerly to nest in suitable localities throughout Manitoba (E. E. Thompson, 1891); but now it is a rare breeder in the Province (Taverner, 1919). To the northeast stray specimens have been taken at York Factory by Blakiston and by Bell (*vide* Preble, 1902).

In the United States the breeding range covers most of the western States. In Washington the Ruddy nests, especially east of the Cascades (W. L. Dawson and Bowles, 1909), and in Oregon Washington it is common as a breeding bird (Willett, 1919; U.S. Biological Survey notes). J. Grinnell, Bryant and Storer (1918) speak of it as a resident breeding species in California, and quote many authorities in regard to particular localities. The breeding range on the West Coast extends into northern Lower California, south to about latitude 31° (W. W. Cooke, 1906). On Washoe Lake, Nevada, Hanford (1903) found the species quite common in summer. In Arizona nests have been found in the Mogollon Mountains (Swarth, 1914; Goldman, Jackson, U.S. Biological Survey), and in New Mexico a good many nest, particularly about Lake Burford (W. W. Cooke, 1906; V. Bailey, 1913; Wetmore, 1920). Wetmore (1921) found it a common nesting bird in Utah, about the Bear River Marshes, while in Colorado nests have been found in many localities (see W. L. Sclater, 1912). I find no breeding records for Idaho or Wyoming, though the Ruddy certainly nests in both States. A. A. Saunders (1921) has collated the evidence as to its breeding in Montana.

In North Dakota the Ruddy Duck is plentiful as a breeding bird (Bent, 1901-02; etc.) and in South North Dakota it has been reported nesting commonly in Sanborn County (Visher, 1913). In the sandhill district of Nebraska it is a regular nesting species (Oberholser, 1920). Central States The U.S. Biological Survey has records of eggs taken in central Kansas and in Iowa, while in Minnesota the Ruddy nests regularly (Roberts, 1919). Kumlien and Hollister (1903) state that a few nest in Wisconsin.

Farther east the Ruddy breeds only sporadically, for instance on the St. Clair Flats, Michigan New York (Langille, 1884; Barrows, 1912), and on the Seneca River, New York (Eaton, 1910). In New England specimens have been seen in all the States in summer (G. M. Allen, 1909) and young in down have actually been taken at North Truro, Massachusetts, on Cape Cod (G. S. Miller, jr., 1891) where a small colony existed for a few years. In Connecticut a female nearly ready to breed was shot as late as June 5 (Sage, 1893). Summer stragglers, all non-breeding birds, have been taken as far north as Newfoundland, Nova Scotia Godbout, Halifax, Prince Edward Island, St. John (New Brunswick), and up the St. Lawrence at Quebec, Montreal, Ottawa and Toronto (U.S. Biological Survey notes). Quebec Spreadborough's statement (in J. and J. M. Macoun, 1909) that he found the species nesting sparingly on the east coast of Hudson Bay from Richmond Gulf to Ungava, Labrador and that on June 21, 1896, he saw a female with four young in northern Labrador, certainly requires further confirmation.

There are a number of southern localities outside the regular breeding range, where the Ruddy has become a local resident and nesting bird. The following colonies have been discovered: in Cuba this Cuba duck has long been known as a breeding bird (Gundlach, 1875) and Dr. Barbour (1923) Porto Rico has recently reported finding nests on the Laguna d'Ariguanabo near Havana. On Lesser Porto Rico, too, it is resident (Gundlach, 1874), and has in recent years been found Antilles nesting at La Plata and Catagena (Struthers, U.S. Biological Survey). Other islands in the West Indies where the Ruddy breeds are: the Grenadines, notably Carriacou and Isle Ronde,





MAP 106. Distribution of Ruddy Duck (*Oxyura jamaicensis*)

Breeding range, dotted line; winter range, broken line  
Sporadic records indicated by crosses (X)







and probably also Grenada (Wells, 1902; A. H. Clark, 1905; Lowe, 1911). Evidently there is a similar isolated breeding locality near San Antonio, Texas, where nests and eggs have been taken (Quillin and Holleman, 1918). In Mexico there is a breeding area at the tip of Lower California about Santiago (Brewster, 1902) and another in the Valle de Mexico (U.S. Biological Survey). Still farther south nests have been found on the *cays* of the Honduras coast (U.S. Biological Survey) and at Dueñas, Guatemala (P. L. Sclater and Salvin, 1859).

Texas  
Mexico  
Guatemala

#### WINTER RANGE

THE winter range of this species is hardly less peculiar than its summer or breeding distribution. On the Pacific coast a few remain as far north as southern British Columbia (Kermode, 1904) and Washington (see Bird-lore, vol. 25, pp. 43, 44, 1923). In Oregon it is rare about Fort Klamath in winter (J. C. Merrill, 1888) and in California it has been seen on San Francisco and Tomales Bays (J. Grinnell, Bryant and Storer, 1918). In the interior specimens occur in winter as far north as Wyoming (Grave and Walker, 1913) and Pyramid Lake, Nevada (Hoffman, 1881), while others winter in New Mexico (W. W. Cooke, 1906) and in Arizona (W. W. Cooke, 1914a; Willett, 1915; Bancroft, 1922).

British  
Columbia  
Oregon  
California  
Nevada  
Arizona

On the Atlantic coast the Ruddy occasionally winters as far north as New England or New York (W. W. Cooke, 1906; G. M. Allen, 1909; Eaton, 1910; Griscom, 1922-23; J. P. Young, 1923), but it cannot be said to winter regularly north of Delaware (Rhoads and Pennock, 1905) and Maryland (Kirkwood, 1895). On the coasts of Virginia it is common enough (Rives, 1890) and the same is true of North Carolina (T. G. Pearson, C. S. and H. H. Brimley, 1919) and South Carolina (Wayne, 1910), but on the Florida east coast it is rather rare, except in certain localities (Scott, 1892; R. W. Williams, 1907; Pangburn, 1919).

Atlantic  
Coast

About the mouth of the Mississippi the Ruddy is common in winter in Louisiana (Kopman, 1921) and small numbers winter farther up the river, in Arkansas (McAtee, *fide* A. H. Howell, 1911) and even in southern Illinois (Ridgway, 1895). On the coast of Texas it is said to be rare (Strecker, 1912).

Gulf Coast

Brewster (1902) speaks of the species as common in Lower California and it has been met with also in the States of Sinaloa and Tepic (G. N. Lawrence, 1874), Jalisco and Colima (U.S. Biological Survey), Guanajuato (Sanchez, 1877-78), Mexico (Sanchez, 1877-78; Villada, 1891-92), Puebla and Vera Cruz (Ferrari-Perez, 1886), Oaxaca (P. L. Sclater, 1859c), and Tabasco (Roviroso, 1887). As mentioned above, it is resident about Dueñas, Guatemala (P. L. Sclater and Salvin, 1859). Farther south it has once been taken in Costa Rica (Carriker, 1910). De Armas (1893) includes it in his list of the birds of Colon.

Mexico  
Guatemala  
Panama

In the Atlantic a specimen was taken on November 24, 1846, in Bermuda (J. M. Jones, 1859; S. G. Reid, 1884). In the Bahamas it occurs more commonly (Bryant, in Baird, Brewer and Ridgway, 1884; Riley, 1905). It is found in Cuba and Porto Rico (Cory, 1889; Struthers, 1923) but is rather uncommon in Jamaica (Bangs and Kennard, 1920). Individuals resident in the Grenadines occasionally stray off to St. Vincent and Barbados (A. H. Clark, 1905).

Bermuda  
West  
Indies

The Penards (1908-10) speak of the Ruddy as a regular species in Dutch Guiana and it appears in Brabourne and Chubb's list (1912-15) as a Colombian species.

South  
America

#### MIGRATION

OF the many flocks of migrating Ruddies which have come in to Wenham Lake, Massachusetts, in the past twenty-two years, all except one was first seen on the water, having come in before daylight. The one flock I speak of, I saw come out of the air very early in the morning. They cut down with a great roaring of wings.



The Ruddy is always a night migrant and is almost certain to stop in some suitable locality before dawn. It is, in fact, very rare to see a migrating flock coming down out of the air. No matter how much disturbed, such flocks will not leave until the following night.

It is natural that a species which breeds and moults so late as does this, should not migrate especially early. This is what we find. At Long Point, Lake Erie, in the autumn of 1914 the first arrivals (some four or five hundred) came on October 7. Some seasons they do not reach this Point until as late as October 20, but the average is probably between the 6th and 10th. At Wenham Lake in twenty-two years my earliest date of arrival is September 30 (twice) and the average is October 8. The latest first appearance was October 20, 1903, and October 21, 1913. Very few are seen after November 15. The average first arrival on the Potomac River, Virginia, is September 28, but the duck does not become common there until October 25. These eastern migrant birds drift down the coast, many staying all winter in Currituck Sound, North Carolina. They certainly return north by an inland route, for they are exceedingly rare all along the North Atlantic coast in spring. I never have seen one on spring flight in Massachusetts. J. T. Nichols records three seen on the Overpeck Marshes, New Jersey, on April 3. As late as June 5, three were killed in Connecticut and an occasional bird is seen here and there in summer.

In autumn the first clear frosty mornings after a northwester has died down, are almost certain to bring in Ruddy Ducks to our New England ponds. So regular used to be the appearance of the ducks that we often spoke of certain weather conditions as "Ruddy mornings."

In the interior of the country the autumn migration is on about the same dates as in the East, or perhaps a little earlier, and few remain in Canada or the northern States after the first week of November.

In spring the flight up the Mississippi Valley is not especially early, reaching Manitoba and southern Saskatchewan in late April or the first week of May, and the northern extremity of the range in middle or late May. The average date of departure from the Potomac River is May 10 and the last seen there was on June 21.

We do not know anything about the movements of the sexes on migration. Those which we obtain in mid-October in eastern Massachusetts, are nearly always females with their broods and I should think that old males (as with many other species) must be rare on migration all over New England. As with many other birds the young spread out far more on migration than the adults.

### GENERAL HABITS

THE Ruddy belongs to one of the most peculiar and distinctive genera of all the diving ducks. With its close relatives in South America, Europe, Africa and Australia, it forms a subfamily which has almost nothing in common with any other group. It differs in almost every particular from other American ducks. Its distribution is odd, but most nearly like that of the Red-head. Its intimate habits, its stupidity, its curious nesting customs and ludicrous courtship performance place it in a niche by itself. Even its eggs are unique in appearance and are deposited in a slipshod, irregular manner that is most extraordinary. Everything about the bird is interesting to the naturalist, but almost nothing about it is interesting to the sportsman.

It may be well to summarize some of the noteworthy points in regard to the Ruddy Duck. First, its southerly breeding range, short migrations and tendency to become sedentary, traits which lead to the formation of entirely isolated and often temporary



breeding colonies. Second, its preference for fresh or brackish water, usually waters of large extent, and its avoidance on migration of small ponds enclosed by woods. This last is especially well seen in New England where they will not alight unless the lake is half a mile or so long. Third, the dependence upon dense vegetation growing out of the water for nesting sites and their association with Coots (*Fulica*) rather than with ducks.

It would not be possible to close this general section without speaking of the bird's anatomy. The peculiar shape of the huge head, the clumsy legs and feet, and the long, stiff tail are familiar to any one who has once seen it. But what is not seen is a large air-sac opening off the wind-pipe and lying between it and the oesophagus. This structure, which is present only in males, was first studied by Wetmore (1917). It consists of a pear-shaped sac 50 or 60 millimeters long by 30 or 40 broad, which has no connection with the pulmonary air-sacs of the body. It is used as a sort of sounding board during display (see under Courtship and Nesting) and seems to take the place of a special dilatation (*bullæ ossea*) of the syrinx such as is found in most male ducks. Besides this air-sac the internal structure of the larynx is peculiar, for there is present a pad or flap, which Wetmore calls the *pulvini laryngis*, that apparently has the same function as the mammalian epiglottis. No doubt similar structures are present in other members of the genus for their general form and habits suggest it.

WARINESS. Some of the names, Booby, Sleepy-head, Fool Duck, Deaf Duck and many others that have been heaped on the innocent head of this confiding bird, give a good idea of its psychology. Indeed, it would be hard to imagine a tamer duck and one that has profited less by the noisy education delivered to it so regularly by the shooting public.

In pursuing the little families on New England ponds one may be practically certain of being able to paddle or row just as near as he cares to for a shot without special caution. Even after the first shot it is possible to get others, in fact enough to wipe out an entire company with time and a little patience for they never leave the lake by daylight. I have seen a flock that had been persistently worried, become so shy that they would dive and scatter long before a canoe could get up to them; but this amount of education was not accomplished in a single day, it only occurred in birds that had remained in the lake for a week or more.

I used to think that it was not possible to take these birds from a "blind" on shore for they do not respond to live or wooden decoys, except perhaps as single birds. But during years when we were unable to use a boat on account of water-board restrictions, I discovered that some time during their explorations of the lake a batch of Ruddies was almost certain to explore every part of its shore-line and would come close enough to the live decoys at least once, just out of pure curiosity.



Very large rafts such as one sees in the southern States keep out of gun-range and are often seen among huge flocks of Coots. They can, however, always be worked by a line of boats and driven about more or less as desired.

It is remarkable in so foolish a bird as this to find that on the nesting grounds the brooding female becomes very wild indeed; in fact she has been classed as the shyest of nesting ducks (Bent, 1901-02; and others). Very seldom does the searcher find her sitting on her eggs, for she glides noiselessly away from her nest long before he has come anywhere near it.

**DAILY MOVEMENTS.** The Ruddy, as far as I have seen, migrates exclusively by night. It is a day-feeder and I very much doubt whether it ever feeds actively at night. On this point, however, more information is necessary.

**GAIT, SWIMMING AND DIVING.** This is one of the few ducks of which it can be said that it almost never comes ashore. It is true that they will haul out in shallow water and I have occasionally seen tired little flocks swim to shore and go to sleep on a sand beach covered by only an inch or two of water. But I do not remember to have ever seen one actually on land, nor can I find any notes of others to this effect.

These ducks dive in preference to swimming when suddenly alarmed, but I do not think they can stay under an especially long time, probably not more than fifty or sixty seconds. When at rest on the water the tail is usually cocked up at a steep angle; during courtship, even past the perpendicular. Often, however, when they are actively on feed the tail is kept low between dives. It no doubt acts as a sort of rudder under water.

In the field the big chunky head and bill, very short body and erect tail identify the Ruddy Duck at almost any distance. On the wing the low flight, quick wing-beats and long tail are very noticeable. Instead of lying over on their backs, as Pochards and Scaups do when they preen the feathers of their under parts, these ducks stand usually erect in the water, treading the feet rapidly to keep their balance.

Ruddies patter along the water for a good many yards if there is no wind, and it takes them a long time to get up any real speed. They make the easiest kind of shots before they are well started for they never rise more than a yard or two above the water. After they have traveled a short distance their speed is greatly increased and the shooter who would center a single one coming down-wind under full headway must have good correlation between his eye and hand. The small wings beat with extreme rapidity in order to keep the bird in the air, but the wing arc, as Griscom (1922-23) has pointed out, is very short, the wings not being elevated or depressed much above or below the body.

As to the size of flocks, the migratory family parties as we see them in New England are usually small, from four or five to ten or a dozen, rarely 25 or 30. On the



wintering grounds enormous rafts congregate at times, or when feeding scatter out all over the water so that scarcely ten square yards remain unoccupied. Since the Ruddy has become so scarce a migrant in New England, that is in the past twelve or fifteen years, few flocks of over six or eight are seen.

ASSOCIATION WITH OTHER SPECIES. This is always a bird which cares nothing for the society of other kinds of ducks. Probably under normal conditions it never seeks their company, but I have often seen single ones (left-overs from flocks?) join in with Lesser Scaup or Buffle-heads. They crave company of some sort and are extremely gregarious amongst themselves.

On their wintering grounds they gather in very large companies and they are joined by immense rafts of Coots. Just what this association means I do not know; it may be merely a sort of safety resort. However, I think the two sorts of birds derive some mutual benefit from the food which is pulled up.

It selects for its nesting site situations identical with those of various species of Coots, besides Red-heads, Canvas-backs and Grebes. Being very shiftless in its domestic arrangements it appropriates the nests of Coots or scatters its eggs in various other ducks' nests, while its neighbors are not much more particular in their own habits. Almost every field-collector has had something to say on this point. Bent (1901-02, 1907) tells of their laying in the nests of Canvas-backs and Red-heads, while he found one Grebe's nest that had two Grebe's eggs and one Ruddy's egg in it. Brewster (1902) reported that in Lower California it associated closely in its nesting with the Short-winged Grebe. In Colorado both Canvas-backs' and Red-heads' eggs have been found in the Ruddy's nest (Rockwell, 1911) while Macoun records a nest in Saskatchewan which had fourteen Ruddies', two Canvas-backs' and one Red-head's egg in it. Parasitic habits were found by Francis Harper in the Athabasca delta where he saw a Lesser Scaup's nest with an egg of the Ruddy in it. In Montana the Ruddy has been accused of placing its eggs in the nests of Pintails and Shovellers (Thomas, in A. A. Saunders, 1921).

VOICE. Few people have ever heard any sort of noise from a Ruddy Duck. In autumn and winter both males and females are (I think I can say this safely) absolutely silent birds. But the case is different during courtship, when both males and females do utter a few very curious low sounds.

The male's display-note follows the curious little *tick-tick-tick-tickety-quek* noise caused by the bill striking the breast above the swollen air-sac. It follows directly after this series of sounds and is certainly vocal and made up of two sounds uttered synchronously (Wetmore, 1920). One of these is a harsh frog-like note like the syllable *quok* and the second is "slightly drawn out, almost two syllabled, with a reedy quality resembling the note of the male Gadwall." This second note was



thought to be caused in a normal way, but the first possibly by expulsion of air from the tracheal sac by a contraction of the dermal muscle, the *cucullaris*. Harper (MS.) described this as a little frog-like "purring" note, which was plainly heard at twenty-five yards and audible at twice that distance. Several sounds seem to be given on occasion by the females. They imitate the males with a sort of falsetto *qua-er*, at times even producing a rattling noise by striking the tip of the bill on the breast, a sound, however, different from that made by the male in a similar manner. Breeding females nervous over the presence of an intruder swam back and forth calling "*whap* or *guep* in a curious flat tone." Still another note which Wetmore heard was a *keow keow* in a high tone somewhat similar to the note of a hen Turkey.

**Food.** The food of the Ruddy is variable but on the whole it mostly consists of the best kinds of vegetable matter intermixed with fresh-water insects and their larvæ. On the Pacific coast it is said at times to eat shell-fish. It often favors ground where Canvas-backs and Red-heads get good living.

Sixty-five stomachs collected mostly in the winter months in nineteen States and Provinces were examined by the U.S. Biological Survey (MS.). Forty-seven of these were well enough filled to be used in estimating the proportions of the different foods and show that the Ruddy is closely related in feeding habits to the Canvas-back and the Red-head. The vegetable food was taken to the extent of 85% of the whole, and wild-celery buds, the seeds and foliage of pond-weeds and musk-grasses were preferred. Widgeon-grass, coontail and eel-grass are sampled and the seeds of a variety of aquatic and marsh plants such as water-shield, water-lilies, water-milfoil, bur-reed, smart-weeds and sedges.

The animal food found in this group of Ruddies was only 15% and consisted of the larvæ of fresh-water midges, caddis-flies and aquatic beetles while in salt water small shell-fish and crustaceans were taken.

Migrating Ruddies that I have taken at Wenham Lake, Massachusetts, have little or nothing in their stomachs. Even so they do not appear hungry for they usually float about all day without feeding and leave some time after dark. Out of ten stomachs of such birds, six were empty or nearly so and the rest contained vegetable matter, 40%, and animal matter, 60%, besides gravel, etc. Seeds of bur-reed, pond-weed, bulrush and *Anias* as well as buds and other parts of wild celery were the plant items, while chironomid and hydrophilid larvæ and the eggs of water-mites (*Hydrachnidæ*) comprised the animal substances. One which I shot on Martha's Vineyard contained broken oögonia of a *Chara* (sp.) besides other ground-up vegetation. Barrows (1912) found 22,000 seeds of a pond-weed in a single stomach from Michigan, while other analyses from various places (U.S. Biological Survey notes) record small seeds, soft small worms, insects and tule seeds. The young eat a large amount of insect larvæ and other animal matter.



COURTSHIP AND NESTING. The many curious traits of the Ruddy are brought out in its display as well as in its breeding habits.

They probably do not mate early, at least, part of them mate only after reaching the breeding grounds. It seems that the young of the year, which acquire breeding (summer) plumage later than the old birds, may also pair very much later. Investigations in Missouri by the U.S. Biological Survey showed that these ducks were not paired, nor were the ovaries of the females enlarged as late as March 22. So far as we know all males reach full plumage the first season and it is presumed from the small number of unmated birds seen on the breeding grounds that most of them breed when ten months to a year old.

The display itself has often been spoken of as ludicrous and this is in fact an apt word for it. It has been described in part by A. Brooks (1903), W. L. Dawson and Bowles (1909), F. M. Bailey (1919, pp. 3, 110) but most completely by Wetmore (1920). This last account is so complete and interesting in itself that it will be better to quote it in full.

"The curious display of the males was seen every day and was observed to the best possible advantage, as frequently birds displayed within thirty feet of me. They seemed to keep up the curious performance constantly all day long and sometimes displayed for half an hour or more when no females were near. As a matter of fact this action often began whenever I drove the males to open water from the shelter of the rushes. The manner of procedure was as follows. The male rested on the water with tail erect at an angle of 80 degrees. The head was then drawn in and jerked rapidly up and down several times with the bill depressed, so that the tip of the bill struck the side of the breast above the tracheal air-sac (present in the male alone) producing a curious clicking sound. The bill tip was gradually lowered until at last it hit the breast feathers at the water line splashing the water into foam. At the same time the tail was drawn steadily forward past the vertical to an angle of 60 degrees on the opposite side of the arc, so that the tip came within one and a half or two inches of the head. At the close of this action the head was suddenly extended with the mouth open, and the bird emitted a low croak. The tail was then thrown back to the usual position and the bird resumed its normal attitude. In addition during the display the feathers of the crown were elevated at the sides and depressed in the center to form a deep V that was broad in front and more narrow behind. Sometimes birds held the crest thus elevated constantly, and again it was thrown into this form only as the last notes were given, when it was flattened immediately to the normal position. The sounds produced during the display may be represented by the syllables *tick-tick-tick-tickety-quek*. The first series is not vocal but is produced by the bill striking the breast above the swollen air-sac, so that this sac is apparently used as a tympanum, a use which explains its development as a secondary sexual character in the male. The last note is vocal and is made up of two distinct elements



or sounds uttered synchronously. One of these is a harsh frog-like note that may be represented by the syllable *quok* and the second is slightly drawn out, almost two-syllabled, with a reedy quality resembling the note of the male Gadwall. It was thought that this second note was made in the normal way by the syrinx, and the first was caused by the expulsion of air from the tracheal sac, as a contraction of the dermal muscle known as the cucullaris above the sac was plainly evident through movement of the skin of the neck as the duck extended his head and made this last sound. As this note was given the tips of the wings were elevated for two inches or more, so that it seemed possible that the carpal joint of the wings pressing against the sac (which occupies the whole front of the neck above the breast) aided in expelling air from it.

"Males were seen constantly swimming after the females, checking to give the display and then continuing on. At a distance they resembled absurd little manikins with quick jerky motions controlled by the pulling of strings. At short intervals the males extended their heads on the surface and flapping their wings made a quick drive forward for three or four feet making a great boiling in the water with wings and feet. Immediately they resumed the erect position and began the display again. Females were rather shy and when pursued too closely escaped by diving."

Males often show a good deal of rivalry and drive at each other with their bills, the attacked bird usually diving to escape. Sometimes, however, the rival holds his ground and the pursuer either retreats or springs from the water and strikes him on the head or back with his broad feet (Wetmore).

F. Harper saw another sort of display by a male in the Athabasca region (July 13). Several times this male ran over the water for two or three yards, apparently with the full use of its wings; "and as nearly as I could distinguish in poor light and at a considerable distance, it went through much the same sort of motions as usual with head and bill, while still on the run; then came to a stop, with a sort of *blob-blob* sound, and finally thrust its head forward as at the end of the ordinary display."

Ruddies often display well into the summer (August) and probably continue to do so until the moult into autumn-winter (eclipse) plumage begins in late August or September. Mrs. F. M. Bailey noticed a still-downy young one "assuming the airs of its forebears" in display attitudes. As a rule, however, display begins to lessen after mid-June. When they are in full activity, any disturbance, even the presence of a person nearby, will start the male on its performance.

The females very commonly mimic the males in display postures and even make a rattling noise with their bills against their chests. This sort of thing was given at times by females that were apparently unmated (Wetmore, 1920).

The season of egg-laying is late all over the middle and northern part of the range and falls from middle June to late July. There are early clutches recorded: May 1 to 28 in southern California (J. Grinnell, Bryant and Storer, 1918); May 31 for Colorado



(Rockwell, 1911); June 4 for Montana (A. A. Saunders, 1921); but the average time in the United States, Saskatchewan and Alberta is middle to late June for the first eggs (Bent, 1901-02; Job, 1915; etc.). It is common to find young unable to fly all through August and Mr. Wolfe has found eggs near Edmonton at the beginning of that month. Near Provincetown, Massachusetts, young not over ten days old were collected September 10 (Museum of Comparative Zoölogy specimen).

When we come to the many isolated southern colonies we find the Ruddy taking on the habits of tropical ducks and nesting at almost any time of year. In Guatemala they were found laying in May (P. L. Sclater and Salvin, 1859) and in Lower California downy young were collected on November 16 (Brewster, 1902). In Porto Rico near La Plata on December 3, 1921, and February 18, 1922, P. H. Struthers (U.S. Biological Survey notes) found eggs, while in Cuba they were nesting at the end of January (Barbour, 1923) and the males were in full breeding dress at that season.

The site chosen for the nest is usually in dense clumps of reeds standing in water. The water may be two or three feet deep or it may be very shallow, but almost always there is some water under the nest.

The Ruddy builds a rather bulky but poorly made structure of more or less interwoven reeds or rushes, sometimes merely crushing down a dense place to get the same result. It often appropriates old Coots' nests or uses these structures as a basis for its own. On Malheur Lake, in Oregon, and also in Colorado, clutches have been found placed in the sides or on top of muskrat houses (Willett, 1919; Rockwell, 1911). At Santa Cruz, California, the nests were all formed of dry tules, and those forming the lining were picked into fine shreds and slightly mixed with down of the parent (Ingersoll, 1884). Langille (1884) found one on the hollow side of a floating log.

Sometimes the nests are well concealed, but at other times they are easy to find. A few are very poorly constructed and in some cases the eggs have actually been found wet in a carelessly made nest. The size and shape is also irregular, from eight to fifteen inches high and ten to twelve inches in diameter, while the cavity may be so small as only to allow two or three eggs on one level. Clutches deposited in several layers are common.

The clutch is extremely irregular, apparently consisting of any number from five or six to as many as twenty (Baird, Brewer and Ridgway, 1884) but large clutches are the rule. The eggs are grayish white and very rough on the surface like those of the European White-headed Duck.

Twenty eggs from California average 64 by 46.2 mm., the greatest length 66.5 and the greatest width 48.0. The smallest egg was 62 mm. long and 44.4 mm. wide.

The incubation period has not been well investigated. Mr. D. H. Bendick of Leduc, Alberta, who has had a good deal of experience in rearing water-fowl from eggs gathered from wild birds, writes me that he hatched some in twenty to twenty-one



days. This is a period comparable to that of the Common Green-winged Teal and at first sight seems extremely short. But we know now that several species of diving ducks have very short incubation periods of from twenty-two to twenty-five days.

Another curious thing about the Ruddy is that not all the eggs found are in the same stage of incubation and it is certain that the females lay more or less in each other's nests, for their nests are often rather close together.

The incubating female behaves in a very curious way, for in spite of the tameness of the species under ordinary conditions she appears at this time wary and retiring, never allowing herself to be caught on the nest. Langille (1884), speaking of nests on the St. Clair Flats, reported the observations of a Mr. W. H. Collins, a taxidermist of Detroit, Michigan. The latter watched a female leave her nest and said that "she scrambled off like a mud turtle from a log, and diving from the edge of the nest, which, as usual was over the water, swam in clear sight under the bow of his boat." As a general thing, so shy is the female, that she is never seen near the nest at all, even when the eggs are well along in incubation (Bent, 1901-02; Rockwell, 1911; etc.).

When they are first hatched, the young are able to dive well and all through their growth they seem to be left a good deal to themselves, for the mother does not appear gifted with any large share of maternal instinct, and deserts them at the least pretext. In consequence young broods are very much mixed up or scattered. The male retains some little pride in his own or other families (we hardly know which) and is seen with the young broods until they are a third or half grown, behaving in a most gallant fashion, displaying on any or every occasion and rushing at real or imaginary intruders with a great show of jealousy. He is therefore wholly an exception to any other North American duck (excepting only the Tree Ducks) for he goes into moult much later than any other species and spends the summer parading about in the full glory of his rich red plumage.

We do not know about the sex migration in this species. I think it is extremely probable that the old males fly at a different time, or on a somewhat different route for they are extremely rare in New England. They probably start later than the rest for they could hardly get their new wings much before late September.

**STATUS.** The history of the economic use of this duck is most amazing for the bird was not appreciated as a table delicacy until about the middle nineties. Then, when the larger diving ducks (Red-heads and Canvas-backs) began to grow scarcer and more expensive the Ruddy appeared in our eastern markets in numbers simply enormous. Cheap at first, they were soon appreciated, and the price rose to two dollars or even more per pair. The next twelve or fifteen years witnessed a great slaughter of these ducks, especially in Chesapeake and Currituck waters for the Ruddy was too much of a fool to hold his own as soon as man found him useful.

When I first went to Currituck in December, 1896, the whole of that vast sound



was simply paved with Ruddies. I can only describe it by saying that it looked as if one could walk dry shod from Church's Island to the Currituck Lighthouse, some eight miles, without getting his feet wet, by simply stepping on the backs of these ducks! This continued only for a very few more seasons and by 1910 Ruddies were getting scarce after the first of the shooting season. I do not think they have picked up very much in recent years in the East; certainly they have not recovered what they lost in that period of market shooting.

I noticed the same thing at Wenham Lake, Massachusetts, between 1899 and 1920 when I figured the reduction (Phillips, 1921) to amount to at least 70%. It is possible that other factors such as increase of street-lighting, etc., may have had some effect in preventing Ruddies from coming in at night. However that may be, I know that in the old days, 1890 to 1899, although I kept no regular records, the Ruddy was about the commonest duck on the Lake in October. There is therefore little doubt about the great diminution in that group of Ruddies which reached the Atlantic coast from the West. It is difficult to form an idea of the change of status in the Mississippi Valley. There it has not been shot so hard and now is probably but little disturbed by sportsmen because it is an inferior duck for everything except the table. It is recorded as greatly diminished in the Kansas City region (H. Harris, 1919). In eastern Colorado one observer (Bergtold, 1924) found very great annual fluctuations but on the whole a tendency to an increase in recent years.

In California it still holds out in goodly numbers and is not much shot for sport. The reduction of nesting grounds will ultimately have a bad effect upon it, and as the boy gunner becomes commoner and the large ducks scarcer, it may not have such a happy time.

As a nesting species it is almost the rarest breeding duck on the Athabasca delta, which is just about its real northern limit (F. Harper, MS.). South around Edmonton it is common and breeds plentifully, although here as everywhere else it is local in its distribution (W. Rowan, *in litt.*). Drainage and reclamation cannot but have a very marked effect on the breeding grounds all over our middle-western States, especially in Minnesota. The dropping of the water level in some of the great lake districts of North Dakota must surely reduce its nesting areas. It is a very common nester in the Bear River marshes of Utah, where 175 pairs were estimated as breeding (Wetmore, 1921), and it is one of the commonest ducks on Lake Burford, New Mexico, where at least 55 pairs nest (Wetmore, 1920). The southwestern States, where it is largely, of course, a resident, form one of its chief centers of abundance. It does not seem to reach Florida in really large numbers. On the whole the future of the species, if we look a good way ahead, is not bright. It may be possible to remove it from the list of game ducks and give it periods of protection when that becomes necessary.

One of the most curious and freakish things recorded of the Ruddy was its establish-



ment of a little colony on a newly formed lake on Cape Cod, near Provincetown, Massachusetts. This pond was formed by a dam about 1870 and in 1873 (possibly before) these ducks began to breed there and kept it up for at least seventeen years for G. S. Miller, Jr., took specimens there in 1891. Probably there were never more than a few pairs, nevertheless it shows that this duck's breeding range is not a hard and fast affair. It takes up its abode almost anywhere that it finds the proper combinations of nesting cover and good feeding not too far north for its delicate nature.

**ENEMIES.** Very little has been published on this matter. Eggs are subject to the same conditions as those of Red-heads and Canvas-backs.

C. S. Thompson (1901) found several very thin specimens in California which contained "tape worms" as much as two feet long.

**DAMAGE.** None.

**HUNT.** As this is in no sense a sporting duck, little need be said about its capture. In most places it is difficult to take in any fair or "sporting" manner. In New England lakes a good many used to be taken from canoes or boats by simply rowing carefully to them when the little flocks appeared on the ponds. After they became shy they made pretty shooting, rising at long ranges after dives and usually scattering out all over the water so that good shots were hard to get. Sometimes one boat would pick up fifteen or twenty, even thirty in a single hunt, but such bags were unusual. They will at times swim close up to a Massachusetts shooting "stand," merely, so it seems, out of idle curiosity, for they care nothing about associating with surface-feeding Mallard decoy ducks. Neither is it easy to work them with a string of wooden decoys rigged on an endless line and pulled back and forth into the pond.

In the southern States large numbers were shot by placing batteries (sink-boxes) in certain places and driving Ruddies by them. They do not decoy to the battery, but fly by it at top speed almost level with the water. Large numbers were also bottled up in some bay or creek by a line of boats and then shot as they flew out or tried to escape by diving. They cannot be driven over land, not even over a marsh, so that they can be forced to come out past the boats, just like Coots (the Blue Peter of the coast shooters).

In Cuba, Dr. T. Barbour (1923) says they have habits like the Masked Duck, living in lakes where the vegetation is so thick that there is scarcely any open water and it is difficult to see them at all. There the native hunter pushes about in a little pirogue with a long bamboo pole, silently and fast, and surprises the ducks who dive and swim away. The only thing to be seen is the slight agitation of the bonnet leaves,



“hardly perceptible except to the trained eye,” but the hunter shoots just ahead of this movement and usually gets his duck.

**BEHAVIOR IN CAPTIVITY.** This is a very difficult species to keep under fence and has never been exhibited in collections anywhere. Herbert K. Job (1915) wrote that this was one of the ducks that he could do nothing with when he was rearing waterfowl from wild-gathered eggs in Saskatchewan. He hatched out some eggs and also caught a few young from wild broods, but none of them survived beyond the fifth day. He calls the young ones “round, fat, helpless things, almost unable to stand upon land.” They seemed utterly stupid and declined to eat anything, even refusing to swallow food that was put into their throats!

Mr. A. Wolfe of Edmonton writes me that he once reared a brood until it was two weeks old when a large Orpington hen which was their foster mother killed them all by treading on them. He thinks it would be possible to raise them under a good bantam hen, but they are extremely lifeless creatures and require special attention.

Mr. D. H. Bendick of Leduc, Alberta, informs me that in 1920 he reared five from a clutch of nine eggs, using a Mallard duck as foster parent. He keeps the old duck with the young, wired in close around a shallow cement pool, so that the old duck cannot wear out the ducklings by walking about on land. The young he found also were very helpless and “soon get run down.” He always fed them in the water on boiled rice, boiled whites of eggs, plenty of lettuce chopped very fine and some boiled liver. He trapped flies and threw them upon the water in order to get them started feeding. After this (the most difficult part of the rearing operation) has been accomplished they will eat freely, even wheat, boiled vegetables, etc. He has never tried to keep his stock through the winter. In 1923 he reared others, so he writes me, and noticed that the incubation period was very short.

**HYBRIDS.** None recorded.



## MACCOA DUCK

*OXYURA MACCOA* EYTON

(Plate 85)

### SYNONYMY

*Oxyura maccoa* Smith, Cat. South African Mus., p. 37, 1837 (*nomen nudum*); Illustr. Zool. South Africa, Aves, pls. 108, 109, 1847.

*Oxyura* (*Erismatura*) *maccoa* Eyton, Monograph Anatidæ, pl. 24, fig. 1, 1838.

*Erismatura maccoa* Eyton, Monograph Anatidæ, p. 169, 1838.

*Erismatura leucocephala africana* Reichenbach, Synopsis Avium, Natatores, pl. 78, fig. 899, 1845 (*Erismatura africana* in text).

*Erismatura maccao* G. R. Gray, Genera of Birds, appendix, p. 28, 1849.

*Erismatura moccoa* Bonaparte, Comptes Rend. Acad. Sci. Paris, vol. 43, p. 652, 1856.

*Biziura maccao* Schlegel, Mus. des Pays-Bas, Anseres, p. 10, 1866.

*Biziura maccoa* Giebel, Thesaurus Ornith., vol. 1, p. 468, 1872.

*Erismatura mocoa* P. L. Sclater, Proc. Zool. Soc. London, 1880, pp. 530, 534.

### VERNACULAR NAMES

*English:* Maccoa Duck, Red Diving Duck, African Ruddy Duck.

*German:* Maccoa Ente.

*Dutch:* Macow Eend.

### DESCRIPTION

**ADULT MALE:** Almost exactly similar in coloring to the male of *Oxyura ferruginea*. Head and upper part of neck, down to the nape black; lower neck, upper breast, mantle and scapulars bright red-chestnut. Lower back and rump gray. Lower breast and all of abdomen silvery gray, but often stained to a rusty tinge; tail black; wings brown, finely mottled with pale rufous on the wing-coverts and secondaries (in some specimens the median wing-coverts are edged with chestnut); primaries uniform brown; under wing-coverts gray, edged with white; axillars white, more or less stained with gray (Salvadori, 1895).

Iris dark hazel. Bill bright blue. Feet dark lead-blue to greenish gray (Antinori; Sjöstedt).

Wing 160–170 mm.; culmen 40; tarsus 38.

**ADULT FEMALE:** Similar to that of the Ruddy Duck (*Oxyura jamaicensis*) and of the Argentine Blue-billed Duck (*Oxyura vittata*) but easily distinguished by the much broader bill (1 inch in the broadest part) and in having the upper parts with broader freckled bands of a brighter buff color; from the female of *Oxyura vittata* it differs also in lacking the distinct white under tail-coverts (Salvadori, 1895).

**MALE IN FIRST (JUVENAL) PLUMAGE:** almost exactly like the female judging from the few specimens I have seen (four in the British Museum).





MACCOA DUCK  
Male  
Female

BLUE-BILLED DUCK  
Male  
Female  
Downy Young







YOUNG IN DOWN: Not examined. According to Sjöstedt (1910) the young are gray-white; upper head, cheeks, back of neck and whole upper side pale brownish gray. A narrow whitish band runs from the base of the bill under the eye, as well as a wider whitish band from the wings back to the base of the tail. Cheeks paler brown than the upper head. Band across upper breast brownish.

Iris dark brown. Bill bluish black; the lower mandible is yellowish toward its edge. Feet almost black.

### DISTRIBUTION

VERY little is known of the range or habits of this, one of the rarest of African ducks. So far as we know at present it is confined to eastern Africa, from the Cape to Abyssinia. From the few meager dates we have it is impossible to say certainly whether the species is migratory or not, but it is safe to state that in the greater part of its range (with the possible exception of the Cape region) it is resident.

In South Africa this duck has been found about Capetown (Layard, 1875-84) and to the northwest about Piquetberg and at the mouth of the Orange River (Smith, *fide* Stark and Sclater, 1906). More recently, specimens have been taken near Victoria West and Deelfontein (Layard, 1875-84; Sharpe, 1904; Seimund and Grant, *fide* Stark and Sclater, 1906). C. G. Davies (1908) found it rare in September and October in East Griqualand, though Murray states that he shot a good many near Mafeteng in Basutoland (Stark and Sclater, 1906).

Farther to the north, T. Ayres (1869) shot a specimen on the Vaal River near Potchefstroom in December. Nicolls and Eglington (1892) say that it is scarce on Lake Ngami and the South African Museum has a specimen taken by Eriksson in the Tebra Country, west of Lake Ngami.

Undoubtedly it is to be found in suitable localities throughout the region north of this but I have seen no records. In what was formerly German East Africa, Neumann (1898) met with this duck on the lakes of the Masai country in June and Sjöstedt found it fairly common throughout the year and breeding on the Natron Lakes (Kilimandjaro-Meru region). In British East Africa (Kenya Colony), V. G. L. van Someren (1922) found the Maccoa Duck not common on Lake Naivasha in October and December. Johnston (1902) includes the species in his list of the birds of Uganda. Dr. van Someren told me of six specimens taken at Karoli, north of Marsabit in northern Kenya in August, 1923. The northernmost habitat of the Maccoa Duck thus far discovered is southern Abyssinia, where specimens have been taken on Lake Cialalaka in January, on Lakes Haddo and Hora in May, at Arseddi in June and at Ankober in August (Salvadori, 1884, 1888; Giglioli, 1888). Von Erlanger (1905) found this duck rare on Lake Haramaya in March.

### GENERAL HABITS

LITTLE is known of the intimate habits or economy of this duck. It so nearly resembles in coloring the two species of South American Ruddy Ducks as scarcely to be told from them, and in habits all the stiff-tailed ducks seem to be very similar. This species, although much scarcer and more retiring than our North American Ruddy, apparently resembles it exactly in its general habits. Any differences are due to the tropical habitat of the Maccoa Duck, its lack of migration and perhaps to the greater abundance of natural enemies.

The Maccoa does not occur on salt ponds or lakes and is usually classed as very shy, or perhaps better, very retiring in its nature, so that collectors seldom see it. It swims in the characteristic Ruddy Duck position with the tail cocked up and the head drawn far back and deeply sunk between the shoulders. Its ability to escape by diving and the length of time it can remain under water have often been remarked upon.



Although of course it can fly well, it never attempts to escape from danger in this manner, but always by diving and skulking. It often swims very low in the water with only its head and back above the surface. Sjöstedt (1910) says: "They are very shy and careful. On the least pretext they dive, swim long distances under water, look about cautiously when they rise again, and frequently repeat the dive immediately."

This is a solitary and independent species. It is on the whole very unsociable and stays by itself, without actually avoiding other water birds (Sjöstedt, 1910).

No naturalist has heard this duck make any sound, although it is practically certain that it must have some sort of a call-note in the breeding season.

The food has not been carefully studied. One shot by Ayres in a lagoon alongside the Vaal River contained water snails. In the Kilimandjaro region the stomachs were found filled with fine lava-pebbles and water vegetation from the bottom of the ponds.

No doubt the season for nesting is just as irregular as in all other African ducks. A female in heavy moult (both wing and body feathers) has been taken in Kenya Colony in October (V. G. L. van Someren, 1922).

Young in down were found in November in East Africa (Sjöstedt, 1910) and by the middle of December they had a few head and neck feathers as well as a few on the wings, sides and tail.

C. G. Davies found an egg ready to be laid in the body of a female taken in East Griqualand in March.

Apparently no nest has ever been described but we know that the eggs are large, somewhat rough in texture, and of a bluish-white color. The bluish color seems to be more noticeable when the egg is wet.

It is always difficult to get at the relative numbers of any of these Ruddy Ducks, for they live in many places among such dense cover that they are seldom seen. I do not doubt that this is a much commoner and more widely distributed bird than we give it credit for. It is safe to say that it cannot suffer much diminution in numbers from the spread of civilization for a long time to come except in parts of South Africa. It is usually spoken of as the rarest of African ducks. A curious flight of these birds was said to have turned up near Capetown in 1858 according to Layard (in Sharpe, 1884). That writer adds that it has been rare there since that time.





MAP 107. Distribution of Maccoa Duck (*Oxyura maccoa*)







# BLUE-BILLED DUCK

*OXYURA AUSTRALIS* GOULD

(Plate 85)

## SYNONYMY

*Oxyura australis* Gould, Proc. Zool. Soc. London, 1836, p. 85.

*Erismatura australis* Eyton, Monograph Anatidæ, p. 172, 1838.

*Biziura australis* Schlegel, Mus. des Pays-Bas, Anseres, p. 11, 1866.

*Oxyura australis victoriæ* Mathews, Austral Avian Record, vol. 1, p. 87, 1912.

## VERNACULAR NAMES

*English:* Blue-billed Duck, Australian Ruddy Duck, Little Musk Duck.

*German:* Australische Ruderente.

*Aborigines:* Boodoo.

## DESCRIPTION

**ADULT MALE:** "Head, throat, and neck black; breast, back, and flanks rich chestnut; rump brownish black, freckled or barred with irregular pale reddish lines; upper tail-coverts tinged with chestnut; belly and under tail-coverts brown, with the tips of the feathers silvery-rufous white; wings and tail dark brown; upper wing-coverts and secondaries sprinkled with paler points; under wing-coverts and axillars grey, edged with white" (Salvadori, 1895). It resembles the male of *Oxyura ferruginea* but is perhaps not so bright-colored on the lower surface, although this last character varies a good deal.

"Irides very dark brown; bill light blue; front and inner side of the tarsi and toes french-grey, outside of the tarsi and webs blackish grey" (Gould).

Wing 162 mm.; culmen 42; tarsus 35.

**ADULT FEMALE:** Dark brown all over, the upper parts darker and banded with zigzag lines of pale buff color. The lower side probably silvery or silver-buff color in fresh-plumaged specimens, but the gray bases of the feathers show through more or less.

"Bill dark olive green, the under mandible lighter than the upper; irides, legs and feet as in the male" (Gould). This female is very different looking from the same sex in the Peruvian Ruddy Duck (*Oxyura ferruginea*); she lacks the face-pattern, while the upper side is much more plainly barred with light brown (British Museum specimens). Size slightly less than the male.

**YOUNG IN DOWN:** Very dark above, black on top of head, back and rump, with slightly developed light patches on wings, scapular region, and sides of rump (barely perceptible on latter region). The dark color of the head extends down over the cheeks and there is a faint indication of a lighter streak behind the eye, extending back toward the occiput (one specimen examined, collection G. M. Mathews, at Tring).



## DISTRIBUTION

THE Blue-billed Duck is one of the rarest of the Australian *Anatidæ*. It appears to be confined to the southern half of the continent, and to be more common in southern West Australia (Orton and Sandland, 1913; W. B. Alexander, 1921) than in the regions east of the great desert. Mr. L. Reese of Marree, South Australia, writes me that in his vicinity the species is quite common, and McGilp (1923) has recorded it from Lake Frome. In Tasmania this duck is nowhere abundant, though found in various localities (Littler, 1910). In Victoria it is perhaps more common than in any other part of eastern Australia, and it has been so recorded from a number of districts (C. Barrett, *in litt.*; North, 1913; S. A. White, 1918). It is less often seen in New South Wales, where it is hardly more than a straggler to any but the southern parts. The species has been found breeding at Booligal (K. H. Bennett, 1891) and farther north specimens have been taken about Trangie and as far north as Bourke (North, 1913).

## GENERAL HABITS

MR. CHARLES BARRETT of Elsternwick, Victoria, writes me that he finds the Blue-billed Duck favoring inland waters, rivers, lakes, swamps and lagoons. "It is generally considered a rare bird, but in some localities appears to be fairly numerous. Though it is rarely seen on the wing, when the need arises it can fly rapidly, and it makes rather long journeys, apparently at night. It has been observed on water-holes, far from any other place suited to its needs, remaining only for a day or two." J. Gould (1865) noticed that in general habits it resembles the Musk Duck (*Biziura lobata*). He was informed that in West Australia it was never seen on the rivers, either those communicating with the sea or those of the interior, and that it was only found on the lakes surrounded with high reeds and tea-trees, running parallel to and near the coast.

Captain White (in Mathews, 1914-15) notes that they never collect in large numbers in any place; he never saw more than fifteen or twenty together. He speaks of them as very shy birds, especially in the breeding season, although they are retiring at all times.

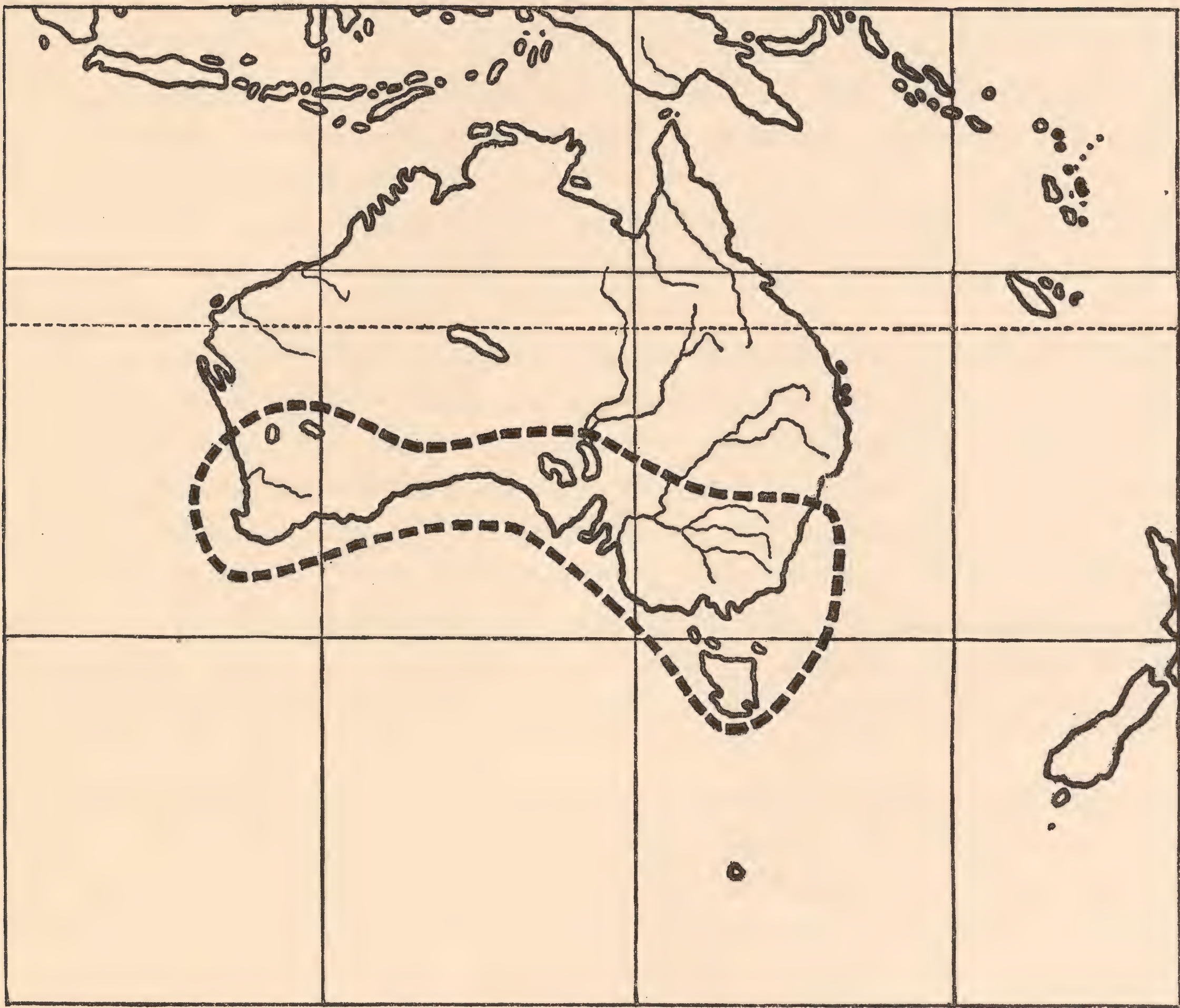
Many observers have noticed their great agility in swimming and diving. Like other ducks of this genus they will not fly if they can escape in any other way. K. H. Bennett (1891) found them extraordinarily difficult to kill, even more so than Grebes or Musk Ducks, which last he succeeded in shooting at far longer ranges. He considered the Blue-bill quicker at diving than any other Australian duck.

Like the other Ruddy Ducks they fly very fast when forced to take wing, but scarcely any one ever sees them away from their favorite element.

Captain White (in Mathews, 1914-15) noticed that they seemed to like the company of Musk Ducks. In some quarters they are even known as "Little Musk Ducks."

The voice has never been described. "The peculiar inward tone" which the natives described to Gould by saying "it has no voice, but makes a noise with its heart," no doubt refers to the drumming or bill-tapping sound of the male's display.





MAP 108. Distribution of Blue-billed Duck (*Oxyura australis*)







This action has been minutely described in the section on the courtship of the common Ruddy Duck. Like all the members of its family this little bird accumulates a remarkable layer of fat under the skin of the abdomen, which results in its making up into poor museum specimens.

The food has been roughly described by Gould as consisting of insects, shelled mollusks, fish, etc. It seems extremely doubtful if it ever takes fish, for so far as I know none of the ducks of this family ever develops such habits. Mr. C. M. Lea writes me that he has found fragments of small shells (*Physa*), pebbles and grit in their stomachs. No doubt they take a large proportion of animal food like their South American relatives.

The display has never been reported on, but there is no question that it is essentially the same as the remarkable performance of our own Ruddy and its South American relatives.

The nesting season in West Australia comes in September and October (J. Gould, 1865). In Victoria fresh and incubated eggs have been found in November (North, 1913), and Littler (1910) includes December in the list of nesting months. S. A. White (in Mathews, 1914-15) gives November and December as the months for laying in South Australia, and says the nesting is later than in other ducks.

The nest resembles that of the Musk Duck, being large, according to Captain White, with the flags bent down and interlaced. It is always built in thick reeds or rushes growing in water. One described by K. H. Bennett (1891) was made of rushes (but without any lining of down) and placed in a low polygonum bush six or eight inches above the water.

The clutch is no doubt just as irregular as in other Ruddy Ducks. J. Gould (1865) says it numbers two to nine or ten, averaging probably five or six. The eggs have the same rough granular texture found in all the ducks of this genus. In color they are dull greenish white, and measure about 68 by 48 mm. (North, 1913; Littler, 1910).

The length of the incubation period is unknown. It seems more than probable that the male stays in the vicinity of the incubating female and assists his mate in the care of the young for at least a few days after hatching. Such habits are apparently common to all Australian ducks. K. H. Bennett (1891) found a nest with two eggs just on the point of hatching, upon which the female was sitting, while only a few yards away the male was swimming about with six or seven newly hatched young. He was lucky enough to get close to the nest before he was observed and he could see the female drop from the nest "like a lump of lead and disappear beneath the water the instant she did so." This habit of diving from the nest seems to be characteristic of the whole subfamily. The male and the newly hatched young seen by Bennett all dived at once and none of them reappeared until they had put some sixty yards between themselves and the observer.

This species has always been considered the rarest duck in Australia and J. Gould



(1865) believed it was confined to West Australia. Since then it has been found to have a much wider range, including the whole southern half of Australia and Tasmania, though it is common only in certain districts. Any agricultural improvements which tend to lower the water level and destroy the reed-beds are bound to react particularly against this retiring species. Captain White (in Mathews, 1914-15) mentions taking nests in the swamps of the lower Murray in 1909 in a region which has since been reclaimed by the Government and is now growing lucerne. Mr. J. P. Bellchambers writes me that it is a rare bird in that region now. Mr. L. Reese of Minnie Downs writes that near Marree, South Australia, the Blue-bill is present in large numbers in some seasons, but other statements to this effect are rarely heard or read. In the Swan River region of West Australia, W. B. Alexander (1921) considers it less common than formerly. Mr. D. Le Souef writes from Melbourne that he considers it a very rare species and he does not remember ever having had it in captivity. Kearnland (in North, 1913) remarks that a great many get drowned by becoming entangled in fish-nets and that all specimens he obtained were taken in this manner.

The enemies of Australian water-fowl are numerous and increasing, comprising all the imported pests like the cat, fox, stoat and mongoose. The dingo or wild dog has been mentioned to me by Mr. Reese. The Black-cheeked Falcon (*Falco subniger*) is another important duck enemy.

All Australian ducks are held in check by long series of drought years, during which it is impossible for them to breed. Then, in some places thousands of young ducks perish naturally during a summer of falling water by being unable to reach their feeding grounds before their wings are grown. Many parent ducks place their nests out on the downs where the water will last perhaps only a couple of months and when this dries up they may find themselves and their broods scores of miles from the nearest water. Bush fires must also be taken into account as possible dangers to all ground-nesting birds.

The flesh does not seem to have an enviable reputation in Australia.



# PERUVIAN RUDDY DUCK

*OXYURA FERRUGINEA* (EYTON)

(Plate 86)

## SYNONYMY

*Erismatura ferruginea* Eyton, Monograph Anatidæ, p. 170, 1838.

*Erismatura æquatorialis* Salvadori, Cat. Birds British Mus., vol. 27, p. 450, 1895.

*Oxyura ferruginea* Brabourne and Chubb, Birds So. America, vol. 1, p. 58, 1912.

*Oxyura æquatorialis* Brabourne and Chubb, Birds So. America, vol. 1, p. 58, 1912.

## VERNACULAR NAMES

*English:* Peruvian Ruddy Duck, Peruvian Lake Duck, Ferruginous Duck.

*German:* Peruvianische Ruderente.

*Spanish:* Pato tripoco.

## DESCRIPTION

**ADULT MALE:** Whole of head, chin, cheeks and back to the occiput and nape, black, except for a small and more or less variable white spot on the chin. Whole upper surface, sides and flanks, as well as the throat and breast, up to the black color of the head, bright rusty chestnut color, fading into the silvery white of the abdomen and under tail-coverts. But in a few specimens (aged?) (Brewster-Sanford collection) the whole of the abdomen is a dark rich chestnut, becoming more blackish on the lower abdomen and under tail-coverts. (Can this be stain?) Wings black, but the wing-coverts with more or less red feathers in them; tail black.

Iris brown. Bill bright blue or bluish, lighter or brownish on lower mandible. Legs and feet blackish to olive-gray (R. H. Beck, field notes; J. L. Peters, field notes).

Wing 146–163 mm.; bill 40–45 (width 24–26); tarsus 36–38.

**ADULT FEMALE:** The fully matured female shows a good deal of variation in plumage. Some (Percy collection; Brewster-Sanford collection; Museum of Comparative Zoölogy collection) are extremely red over the lower mantle, scapulars, flanks and upper tail-coverts. Others, apparently fully adult (and with young ones), are almost jet black on the whole upper side. Some are barred brown and black on the mantle and scapulars, others have a freckled appearance and seem to belong to a different type of coloration. Is the red color a sign of age? Upper part of head uniform dark brown; a broad whitish band includes the chin and extends back across the cheeks on each side to the nuchal area. Throat and breast dark brown, the latter area often deep ruddy chestnut, and always barred with black; abdomen and under tail-coverts silvery white (often much darker through wear, or stained brownish) with many irregular transverse black bars and spots. Upper surface dark brown to blackish, more or less freckled, and often suffused with chestnut.

Iris as in the male. Bill blackish to black on upper mandible, brownish on lower mandible. Legs and feet blue-gray to blackish.

Wing 143–154 mm.; bill 40–45; tarsus 34–36

**MALE AND FEMALE IN FIRST (JUVENAL) PLUMAGE:** In general appearance very similar to the immature Ruddy Duck (*Oxyura jamaicensis*) but the black of the top of the head comes well down be-



low the eyes and the lores are blackish instead of light gray or buff. The upper breast in the young of the present species is rather rich rusty brown and the feathers are barred with black. There is no rusty or red tinge to the upper side and the shafts of the tail-feathers are always bare at their tips.

IMMATURE MALE: At first like female. The first red feathers come in on the mantle or scapulars. Moults and date of assumption of complete dress irregular.

YOUNG IN DOWN: Resembles the young of the American Ruddy Duck but the cheeks are darker and there is no light line (or only a very narrow one) under the eye. White patches on each side of the back absent (?) (specimens in Tring Museum).

REMARKS ON *Oxyura æquatorialis*: Judging from the pair of adults (British Museum) taken in Ecuador at an elevation of 3640 meters by P. O. Simons on January 9, 1899, and labeled *Erismatura (Oxyura) æquatorialis*, there is no valid difference between this supposed species and *Oxyura ferruginea* from Peru with the possible exception of the Ecuador birds having whiter under tail-coverts. The size is the same as in *Oxyura ferruginea*. The bill of the male is 46 mm., the wing 156, and the color of the upper side is not different from bright examples of *Oxyura ferruginea*. The female cannot be distinguished from that species. I have thought it better not to recognize the name *æquatorialis* of Salvadori, for it would take a large series from Ecuador to demonstrate its validity on account of the great variation in all these South American Ruddy Ducks.

I have compared a series of males from Lake Junin with others from Titicaca and there seems to be no special difference over this whole region.

### DISTRIBUTION

THE Peruvian Ruddy Duck is a resident of Peru, though it has a tendency to stray at times far beyond its usual range. Its real home is the high plateau of Peru, where it is moderately common and breeds in considerable numbers on the Andean lakes, particularly on Lakes Puno and Titicaca (J. A. Allen, 1875; P. L. Sclater and Salvin, 1868a; Taczanowski, 1886; von Berlepsch and Stolzmann, 1902; Cherrie, American Museum of Natural History; Brewster-Sanford collection; Percy collection; F. M. Chapman, 1921).

To the north the species strays as far as Ecuador, where specimens have been taken at Antisana and Sical (British Museum) and at Colta, Riobamba (C. Chubb, 1919). To the south it is found in western Bolivia, about Lake Titicaca, and there are two good records of its occurrence very far south in Patagonia: Koslowsky took a specimen in the Valle del Lago Blanco, Chubut, in November (Hartert and Venturi, 1909) which is now in the British Museum (I have myself examined it); on December 28, 1920, Mr. James L. Peters took a specimen twenty miles south of Maquinchao, Rio Negro Province, that is now in the Museum of Comparative Zoölogy. In view of these two records it may well be that some of the earlier references to *Erismatura ferruginea* in Argentina and Chile, which systematists refer to *Erismatura* (i.e. *Oxyura*) *vittata*, really applied to the Peruvian species.

### GENERAL HABITS

ALL the Ruddy Ducks, especially in places where they do not migrate, are mysterious little fowl, seldom seen and little known. This species is no exception, but it does not seem to be nearly so rare as the Maccoa Duck of Africa, which it (and its close relative, *Oxyura vittata*) so much resemble.

Lord William Percy found that these Ruddies of the high Andean lakes are so unwilling to fly as to give one the impression of total incapacity for flight. During





Allen Brooks

ARGENTINE RUDDY DUCK

Female

Male

Downy Young

PERUVIAN RUDDY DUCK

Adult Female

Immature Female  
Adult Male









MAP 109. Distribution of Peruvian Ruddy Duck (*Oxyura ferruginea*)  
Sporadic records indicated by crosses (X)







several consecutive months of careful observation among these birds he never saw one on the wing, although efforts were frequently made to induce them to fly.

They have the same curious swimming posture, with cocked-up tails, as the other ducks of the genus. On Lake Titicaca its food consisted of mollusks, worms and the seeds of plants (J. A. Allen, 1875). When Lord William Percy was at Lake Junin in April, 1920, he collected a series of these ducks and sent two stomachs back to the U.S. Biological Survey. The reports on these have been supplied to me. In the first stomach, which was only one-third full, the percentage of animal matter was 100; vegetable matter zero. It contained nothing except ground-up small bivalves and gravel. The second stomach was three-quarters full and held very little besides animal matter. There were ground-up little bivalves (*Eupera* sp.?) in the proportion of 50%; amphipods 47%; 1 corixid 1%; 1 seed of *Ruppia maritima*, 1 of *Zannichellia palustris* and four of *Potamogeton* sp. (?) 1%; vegetable débris 1%.

No doubt the breeding season is exceedingly irregular. From the notes on the labels of the fine series of twelve males and eight females taken by Beck for the Brewster-Sanford collection in July and August, 1913, at Lakes Titicaca and Puno they were in various stages of fertility during those months. The sex organs of the males were "large" in five, "breeding" size in five others, small in an immature specimen (August 14) and minute in a young bird. On the whole this seemed to be an active period for breeding because among the eight females the ovaries of six were recorded as large, while one bird was actually nesting and one specimen had no notes on its label. J. A. Allen (1875) noticed young less than half grown in this same region during the first of February.

At Junin, farther north, Percy found a female sitting on eggs April 15. The curious feature of this bird (I saw the skin afterward) was that she was actually incubating while in full wing-moult, without a trace of any primaries! Percy was informed, and no doubt correctly, that there were young of this duck at Lake Junin in every month of the year.

While he was at Junin, Percy made some notes on the courtship of this duck which he kindly looked up for me. He noticed that the tail was cocked up and spread and the head also "drawn up." The male also blows out the neck and chest until it is very large and sticks out well beyond the end of the bill. He then taps his chest with his bill, slowly at first, but working up to a rapid beating which may be heard a long way off. Apparently there was no audible vocal sound. He also noticed that this duck carries the tail high up when frightened, just as the Ruddy does, but he did not see it spread out the tail fanwise except during display.

When feeding, the tail was kept flat on the water. It seems that this duck has the same very curious display as our own Ruddy and without a doubt the same extraordinary tracheal pouch in the male.

I dare say this Ruddy is fully as slipshod in its maternal affairs as ours is. Percy



saw a young one not over a week old entirely alone and Mr. J. L. Peters collected a young of *Oxyura vittata* that had no parents at hand, but appeared perfectly at home all by itself.

As to the status of the Peruvian Ruddy, it seems to be a moderately common duck in the great lakes of the table-land at elevations of twelve thousand feet and over.

No hybrids have been described.



# ARGENTINE RUDDY DUCK

*OXYURA VITTATA* (PHILIPPI)

(Plate 86)

## SYNONYMY

*Erismatura ferruginea* Bridges (*nec* Eyton), Proc. Zool. Soc. London, 1843, p. 119.

*Anas cyanorhyncha* Hartlaub (*ex* Lichtenstein MS.), Verzeichniss nat.-hist. Sammlung Ges. Mus., p. 121, 1844 (*nomen nudum*).

*Anas ferruginea* Burmeister, Systematische Uebersicht d. Thiere Brasil., vol. 3, p. 440, 1856 (*nec* Gmelin in Vroeg's Cat.).

*Erismatura vittata* Philippi, Arch. f. Naturges., vol. 1, p. 26, 1860.

*Biziura ferruginea* Schlegel, Mus. des Pays-Bas, Anseres, p. 10, 1866.

*Erismatura cyanorhyncha* Schlegel (*ex* Lichtenstein MS.), Mus. des Pays-Bas, Anseres, p. 10, 1866.

*Oxyura vittata* Brabourne and Chubb, Birds So. America, vol. 1, p. 58, 1912.

## VERNACULAR NAMES

*English*: Argentine Ruddy Duck, Rusty Lake Duck.

*German*: Sudamerikanische Ruderente, Argentinische Ruderente.

*Spanish*: Pato tripoco, Pato zambullidor.

## DESCRIPTION

**ADULT MALE**: Most nearly like *Oxyura ferruginea* but always to be recognized in any plumage by the much narrower bill (19 to 23 mm. as against 24 to 26 mm.). Specimens in absolutely full plumage are rare in collections but from those I have seen it is evident that the red color is always confined to the upper surface, sides, flanks and breast and never extends down over the abdomen as it does at times in *Oxyura ferruginea*. The abdomen is silvery white with the gray bases of the feathers showing through, giving a barred appearance. The under tail-coverts are usually white at the tips, but sometimes rusty. The white chin-spot is sometimes, but not always, present and in one specimen (Miller and Boyle collection, American Museum of Natural History) there is a large albinistic spot on the lower throat. The upper surface is a bright chestnut color, the same as in *Oxyura ferruginea*, and the black head-pattern is of the same extent.

Iris dark hazel. Bill bright blue with more or less of black markings; lower mandible pinkish yellow; nail yellowish. Legs and feet olive-gray to olive-brown.

Wing 137–155 mm.; bill, length 29, width at widest point 19–23; tarsus 35.

**ADULT FEMALE**: Easily distinguished from the female of *Oxyura ferruginea* by the presence of a white spot on each side of the face at the base of the culmen (lores), that extends backward as a distinct whitish line under the eye and back to the occiput. The chin also is whiter. The whole top of head is brown, with indistinct black cross-bars. Below the white sub-orbital line the cheeks are brown like the head, while the chin and upper throat are pure white. The lower parts are silvery white except the upper breast which is barred with black. The upper surface is nearly black with fine wavy bars



and freckling of reddish or buffy color. Tail and wings black, the latter with very fine freckling on the coverts and secondaries.

Iris hazel. Bill dark brown or blackish. Legs and feet blue-gray.

Wing 134-137 mm.; bill, length 38-40, width 19-22; tarsus 33.

FIRST OR JUVENAL PLUMAGE, BOTH SEXES: Duller than in adult females, more brownish and less black above and with the lower surface much darker. The feathers of the abdomen have the tips brown or buff-brown instead of silvery white and the lower abdomen is still darker, inclining to dark gray. The shafts of the tail-feathers are bare at the tips and sometimes (as in the Ruddy Duck) carry the long plumules of the downy tail still adherent to their tips.

ECLIPSE PLUMAGE: Apparently there is no return to a gray plumage, once the red adult plumage of the male is assumed. Males in full moult are still nearly as red on the mantle, scapulars and flanks as in full breeding plumage. Moults are rather irregular as to time of year.

YOUNG IN DOWN: Somewhat like young of the North American Ruddy Duck but lacking the white spot on the sides of the back and with the broad white stripe under the eye reduced to a fine line; perhaps in some cases absent. A wide black band crosses the face from the gape to the occiput and below this the chin and upper throat are nearly pure white like the mid-abdomen. The top of the head is deep shining black and the whole upper side is somewhat darker than in the Ruddy Duck. Lower surface about the same as in the Ruddy, but the flanks darker.

Upper mandible dusky black, lower mandible pinkish flesh-color. Feet dark lead-color to blackish (specimen Museum of Comparative Zoölogy, collected by J. L. Peters in southern Argentina, December 17, 1920).

### DISTRIBUTION

THE Argentine Ruddy Duck is essentially a resident species of Argentina and Chile. In the latter country specimens have been taken as far north as Tarapaca (British Museum) and Antofagasta (Philippi, 1888), but its chief habitat is the lagoon country of central Chile (Gay, 1847; Quijada, 1910). Lane (1897) found it arriving in the Rio Pilmaiguen in February.

In the Argentine, specimens have been taken as far north as the Province of Rioja (Giacomelli, 1907, 1923) and thence south in the Provinces of San Juan in July (American Museum of Natural History), Cordoba (Frenzel, 1891; Schulz, *vide* Dabbene, 1910) and Mendoza (C. S. Reed, 1916). To the east this duck has been taken as far north as Rio Grande do Sul, southeastern Brazil, where the species was found nesting (H. von Ihering, 1900), and in Uruguay (Kerr, 1890; Aplin, 1894; Tremoleras, 1920). In Buenos Aires Province it is moderately common and nests (Durnford, 1878; P. L. Sclater and Hudson, 1889; Hartert and Venturi, 1909; C. H. B. Grant, 1911; E. Gibson, 1920). Farther south the bird is moderately common in Rio Negro (Doering, 1881; Hartert and Venturi, 1909; J. L. Peters, MS.) and in Chubut as far as the Sengel and Sengelen (Durnford, 1878). In seasons of great drought they will evidently go farther south than this, for Wace (1921) says that it has occurred at times in the Falklands and that during the great drought of 1917-18 a certain Bennett found a goodly number of skulls and other remains of birds of this species on Deception Island, in the South Shetland group! (Is this a fossil species?)

### GENERAL HABITS

THIS lowland representative of the Ruddy Duck of South America behaves in much the same way as all the rest of this curious genus. It has little in common with other water-fowl and lives a retired life on waters surrounded by thick reeds or other dense





MAP 110. Distribution of Argentine Ruddy Duck (*Oxyura vittata*)







vegetation. It is always found in the larger lagoons of fresh water and does not associate with other species. Each one, so J. L. Peters says, "plays his own game pretty much to suit himself."

Peters (MS.) writes that it is a most self-sufficient and unconcerned species in southern Argentina, spending most of its time floating quietly on the water just out of gun range, frequently with the top of the bill buried in the interscapulars, enjoying a *siesta*. It is fairly easy to approach, but when danger threatens it escapes by diving. It gets away easily at the flash of a gun and can remain under for a considerable time. Others have spoken of the extreme difficulty of shooting it. "Watchful, somber, silent, and shy, they are observant for a moment or two, then seem to settle lower down in the water in an almost imperceptible manner, till they vanish below the surface and gain the shelter of the reeds. Their dive to the flash of a gun is generally successful; in a word their habits are evasive in the extreme" (E. Gibson, 1920). Hudson spoke of it as inhabiting interior lakes and streams, living almost as much in the water as a Grebe; remaining motionless when disturbed, but gradually sinking lower in the water and diving "when only the head and neck are visible above the surface."

The adult male is easily made out at a long distance by his black head, bright blue bill, ruddy coloring and erect tail; the female by her similar shape (although the tail is not so commonly elevated) and her dusky bill.

At one time observers thought this duck incapable of flight (Lane, 1897) and dependent entirely on its powers of diving. We know, however, that it must fly, for it does on occasion move about from place to place probably entirely by night, just as our own North American Ruddy does. All the ducks of this genus seem utterly incapable of a flight overland during the daytime. On a recent collecting trip to southern Chile, Lord William Percy came across these ducks in places where they always tried to escape by flying. He described them as rising at 150 to 200 yards and flying almost any distance. He only got shots at them by catching them out in open water when a good wind was blowing. He thinks this behavior different from that of the Peruvian Ruddy Ducks which he had collected on the Peruvian lakes on another journey.

The food of this species has not been investigated with any care, but if it is like that of its nearest relatives it must consist of a large proportion of animal matter.

As to the breeding season, so few nests have been found that it is not possible to make any general remarks. E. Gibson (1920) records eggs in eastern Argentina in December (1885) and "two other nests" about the same time. Still another full clutch was taken in the same place on the 5th of December, 1891. J. L. Peters took a young downy duckling not over a few days old at Neluan (Rio Negro Province) on December 17, 1920. I cannot find other records which would give any idea of the season. No doubt it nests all over southern South America later than the common



surface-feeding ducks and Teal of that region: in November and December instead of September and October. C. H. B. Grant (1911) took specimens that were moulting on the body and tail in October. In Rio Negro (Maquinchao) Mr. Peters took an adult male on December 30 that was just getting a new wing and had new tail-feathers also growing in. But all the ducks of that part of the world have irregular moults.

The display is a very striking affair, as it is in all the Ruddy Duck group. It was noticed a long time ago by Durnford (1878) and was well described by him. "When he [the male] is enraged at the presence of an intruder in his haunts, he puffs out his breast to its fullest extent; and bringing down his beak on the hollow thus formed with considerable force, a curious drumming noise is produced, which I have heard at a distance of fifty yards." Of course these actions have nothing whatever to do with a spirit of rage. The male in full sexual activity is so easily "set off" that he starts his performance at the moment of any outside disturbance. The same thing is seen in our Ruddy Duck who often goes into active display when frightened or disturbed, or when other ducks or even Coots come into his view.

Kerr (1890) also gave a good description of display postures and called attention to the fully spread tail which is cocked well forward over the back, but he did not notice the tapping of the bill on the distended crop. This distention of the neck is due, just as in our Ruddy, to an inflation of a large tracheal air-sac (Wetmore, 1917).

The nest is a large bulky structure, like the nest of a water-hen, "but larger and with a deeper hollow in it" according to Gibson. Another nest he described as "resembling that of a water-hen, though somewhat larger, deeper, neater, and more cup-shaped." These nests were situated in a deep swamp among reeds and were built of the dry stems of reeds.

The clutch is from six to twelve. The eggs are granulated in texture, of a uniform whitish cream-color and measuring from 68 to 73 mm. in length by 48 to 54 mm. in breadth.

This duck is not very common in Argentina according to Mr. J. L. Peters' experiences, and those of other collectors. No doubt it is far more plentiful in suitable spots than is ever suspected for it does not occur in flocks and is always inconspicuous by reason of its surroundings and retiring nature.

No hybrids have been mentioned.



## MUSK DUCK

*BIZIURA LOBATA* (SHAW)

(Plates 87, 88)

### SYNONYMY

*Anas lobata* Shaw, Naturalist's Miscellany, vol. 8, pl. 255, 1796.

*Anas carunculata* Vieillot (*nec* Illiger), Nouvelle Dictionnaire des Sci. Nat., vol. 5, p. 109, 1816.

*Biziura novæ hollandiæ* Stephens, General Zoology, vol. 12, pt. 2, p. 222, 1824.

*Hydrobates lobatus* Temminck and Laugier, Planches Coloriées des Oiseaux, no. 406, livr. 68, 1826.

*Biziura lobata* Eyton, Monograph Anatidæ, p. 168, 1838.

*Bizeura lobata* Eyton, Ann. Mag. Nat. Hist., ser. 1, vol. 7, p. 177, 1841.

*Erismatura lobata* Schlegel, De Dierent., p. 275, 1864.

*Biziura lobata westralis* Mathews, Austral Avian Record, vol. 1, p. 87, 1912.

*Biziura lobata menziesi* Mathews, Austral Avian Record, vol. 2, p. 90, 1914.

### VERNACULAR NAMES

*English*: Musk Duck, Steamer Duck, Lobed Duck.

*German*: Scharbenente, Kehllappenente.

*Aborigines of Australia*: Godara, Goolurl, Goolwill.

### DESCRIPTION

**ADULT MALE**: Top of head and nape brownish black, with fine freckling of a buffy color. Lower mandible with a large pendent sac hanging between the rami. Sides of head, chin and throat lighter, having a grizzled gray appearance. Whole upper side including mantle, scapulars, back, rump and upper tail-coverts, as well as the sides and flanks, dark brown to nearly pure black barred with irregular wavy lines and freckles of buff color. Tail black, the feathers long, pointed and stiff. Lower neck and upper breast blackish like the mantle, but the whole abdomen silvery to buffy white, mixed with the gray at the basal half of the feathers. Some specimens are deeply stained almost to chestnut. Under tail-coverts darker, dark brown to blackish, the tips of the feathers white. Wing uniform dark brown and without a speculum.

Iris dark brown; according to Mathews "reddish hazel," so that the eyes may become more brilliant during the height of the breeding season. Bill, with the lobe under the chin, "greenish-black" to "olive black," the lower mandible according to Ogilvie-Grant, suffused with dull pink at the extremity. Legs and feet dark lead gray.

Wing 226–240 mm.; bill 51; tarsus 52; tail 152. Measurements show a good deal of variation.

**ADULT FEMALE**: Similar in coloration to the male, but smaller and with the lobe underneath the chin much reduced and scarcely apparent in dried specimens.

Wing 180–218 mm.; bill 36–38; tarsus 48–50.



**YOUNG IN DOWN** (see Plate 88): The short, deep, curiously formed bill is apparent at a glance, and separates the young from those of any other duck. The entire upper side and the whole head and neck are a dark brown, almost black. The lower breast and abdomen are dirty white in color, rather sharply separated from the dark brown of the upper side along a straight lateral line. There are no white patches on the upper side and no distinct stripes or markings on the face (specimen from South Australia in British Museum).

**REMARKS:** The races *Biziura lobata menziesi* (Mathews, 1914) from New South Wales, Victoria, Tasmania and South Australia, as well as *B. lobata westralis* (Mathews, 1912) from West Australia, proposed by G. M. Mathews, are based on what seem to me trivial characters and are not considered here. The shade of coloration in this, as well as in species of the allied genus *Oxyura*, shows a great deal of variation, especially in the unspecialized female plumage. The size of the pendent lobe no doubt varies a great deal with age and also with season, as more or less homologous sex structures (wattles, etc.) do in other birds, so that it seems to be peculiarly ill fitted to base a geographic race upon.

### DISTRIBUTION

**THE MUSK DUCK** is a moderately abundant species, confined to the southern half of Australia and to Tasmania. In West Australia it is common on many of the lakes and on parts of the coast, though it probably does not occur north of the Tropic of Capricorn (Milligan, 1902; M. A. C. Fraser, 1903; Ogilvie-Grant, 1910; Orton and Sandland, 1913; W. B. Alexander, 1916, 1921). Carter and Mathews (1920) state that the species is abundant and breeds all over the southwestern part of South Australia, but McGilp (1923) reports it as not common about Lake Frome. Mellor (in Mathews, 1914-15) found it common about Lakes Alexandrina and Albert.

In the east the northernmost record, so far as I know, is for the Herbert River, Queensland (Broadbent, 1910). In New South Wales the species is common enough in suitable localities from the northern border south to the Murray River (Cox and Hamilton, 1889; H. E. Hill, 1903; Savidge, in North, 1913; W. H. D. Le Souef, 1907; S. A. White, 1918; F. C. Morse, 1922). In Victoria also it is common, particularly about Lake Boga (A. C. Stone, 1912; North, 1913; Barrett, 1920; Barrett, *in litt.*). In Tasmania it is fairly common and breeds (Legge, 1905; Fletcher, 1909; Littler, 1910).

### GENERAL HABITS

**THIS** is one of the more remarkable and aberrant of all ducks and no doubt a great deal remains to be learned about it. In connection with its shape and anatomy several points stand out as peculiar. The great size of the males as compared to the females, the long, stiff tail, the curious pendent wattle (common to both sexes, but much larger in the male) which hangs down below the chin, the presence of a small pouch under the tongue of the males and the absence of a bony box in the region of the syrinx; all are peculiar. There is also present (where, I have not been able to determine) a gland secreting a musky odor, which gives off a strong smell from the males during spring.

W. A. Forbes (1882), the anatomist, was the first, I believe, to call attention to some of these features. We know that our Ruddy Duck and probably all the stiff-tailed ducks have a simple trachea without swellings or a bony box at the syrinx, and this is interesting in comparing the relationship of the present species. Forbes noticed





MUSK DUCK

Male

Female







the sub-gular pouch formed just as in the male of the Great Bustard (*Otis tarda*) by the duplication of the *frænum linguæ*. If one lifts up the tongue there can be seen under it a small circular aperture which leads into a pouch almost large enough to admit the little finger and this extends backward for some little distance to the base of the tongue. The front of this pouch extends forward as far as the dependent wattle which is attached to the lower jaw, but there is no connection between the two structures. The wattle is formed merely by a "fold of the integuments" and has no cavity within it.

Forbes, too, pointed out that most of the other features of the Musk Duck are thoroughly duck-like. An exception is the ambiens muscle which is large and peculiar in that its tendon perforates the large-sized triangular patella, as it does in the cormorants and in *Hesperornis*. There is also a minor peculiarity in the musculation of the hind limb.

Pycraft (1905) considered this a very "primitive type," whatever that commonly abused expression may mean. He pointed out that the "specialization" in the hind limb and hip girdle, due perhaps to an adaptation to diving habits, was rather toward a resemblance to grebes and to *Hesperornis*. He did not agree with Salvadori in recognizing a subfamily for all the stiff-tailed ducks, but seemed to think they should all be merged with the more typical diving ducks. Classification is of course largely a matter of opinion or of convenience. It seems to me that the present species shows real affinities in habits with all the stiff-tailed group, although it is so different in so many different ways that it stands far apart from all other swimming birds.

In regard to habits a few general remarks might not be out of place. The Musk Duck resembles the Ruddies in many details of display, nest-habits, avoidance of flight except by night, and absence or near absence of voice. The display is a remarkably complex affair and absolutely characteristic of the species. The clutch is smaller than in almost any other duck except the Torrent Ducks, and the eggs themselves have the rough surface common to those of other stiff-tailed ducks.

The bird has confirmed grebe-like habits and is usually found in waters where there is plenty of cover, but at times it collects in estuaries. Solitary specimens turn up in all sorts of unexpected places. North mentions one that found its way to Paddington, a suburb of Sydney. An old residence, which had been unoccupied for some time, had been taken by a new tenant who heard strange noises under the floor of one of the rooms, accompanied by splashing of water. Removing the floor boards revealed the existence of a partially filled-up well, containing a small quantity of water, and in it a large Musk Duck was found and after some difficulty captured.

WARINESS. The Musk Duck is described by all observers as an extremely retiring and shy species, very difficult to approach and very quick to take alarm. Its habit



of keeping in thick cover, more than its actual wildness, helps to keep it out of man's way.

**DAILY MOVEMENTS.** They never move off a sheet of water during daytime, having the same fear of flying from one body of water to another by daylight that all the Ruddy Duck group (*Oxyurinae*) have. They move about freely by night.

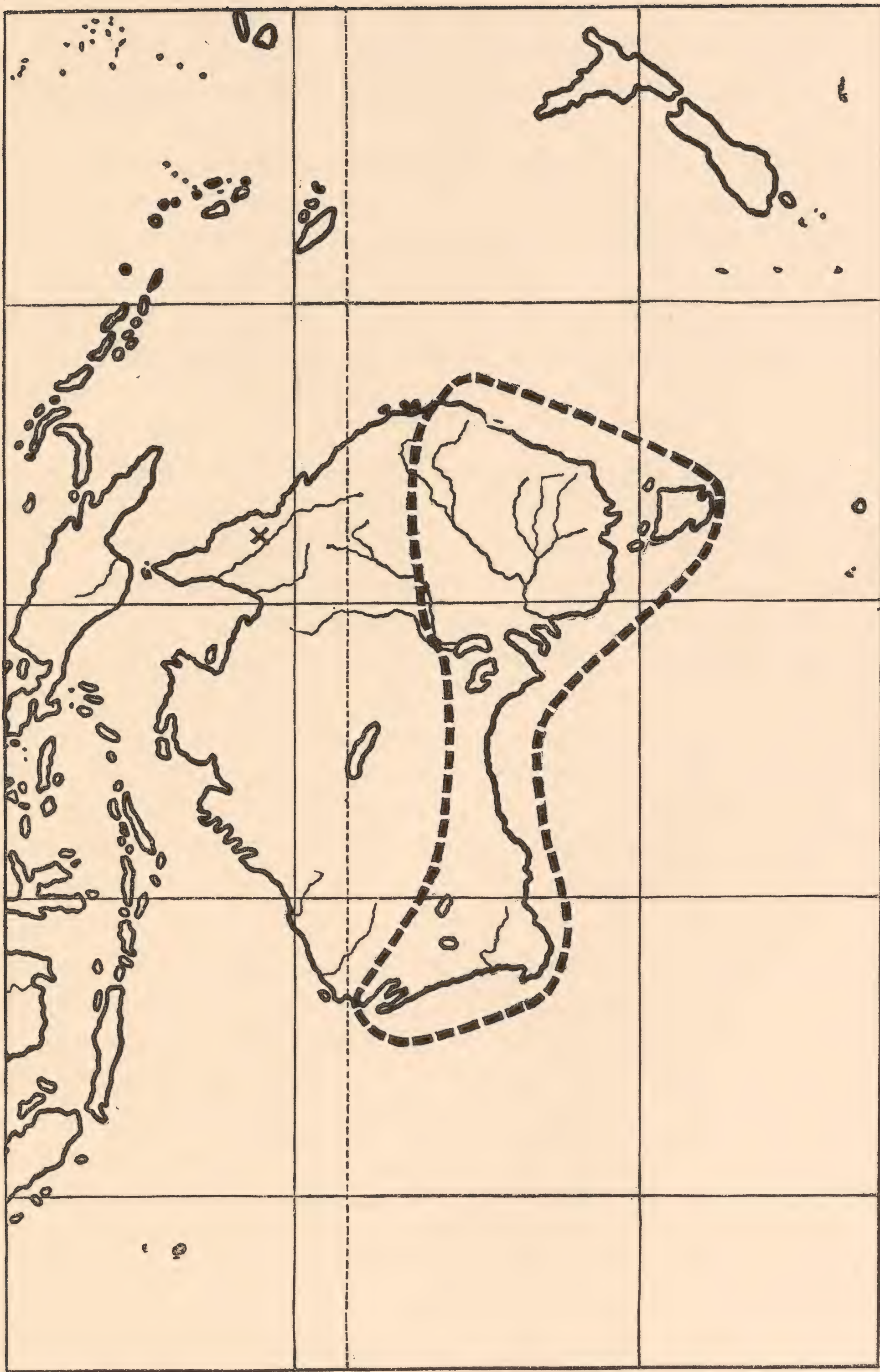
**GAIT.** Nothing recorded. These ducks never go ashore if they can avoid it.

**SWIMMING AND DIVING.** Speaking of one of these ducks which lived for six years in the Berlin Gardens, Heinroth (1911) says that in swimming, the tail-feathers are kept dragging on the water. Observers in the field have noted that they commonly swim with the body submerged, only part of the neck and head showing, ready to dive instantly. Under the water this duck is no doubt one of the most agile of the whole tribe. While no accurate observations have been made in regard to the length of the dive, the universal testimony of naturalists is that they can stay under a very long time and that they can get under the water so quickly that they are difficult to shoot. When suddenly startled they never attempt escape by flight, but immediately dive, frequently with such force and quickness that they throw up the water with their stiff tails to the height of three or four feet, though without causing any noise (Ramsay, 1867).

**FLIGHT.** For a long time naturalists were undecided as to whether or not the Musk Duck ever resorted to flight. Very few observers have ever had the satisfaction of seeing them on the wing, although many have tried to force them to get up by driving them about on a small water-hole, almost always without result. In his work on the nests and eggs of Australian birds, A. J. Campbell (1901) collated all the evidence on this point and now it seems beyond doubt that all individuals can and do fly at times. Bennett (in North, 1913) decided in 1886 that they would not fly at any time except under cover of darkness, but that the flight, once the bird was up, is well sustained. Even by throwing an adult bird into the air, he could not induce it to take wing. Ramsay (1867) tells of seeing mortally wounded birds take to flight, though this was hardly more than a flapping along the water, a habit the bird often indulges in. F. C. Morse (1922) tells of one that fell down on the roof of a house on a moonlight night and McGilp (1923) records an interesting experiment he made in this connection. He put a Musk Duck in a 10,000-gallon tank, in which the water was three feet from the top. It would have been impossible for the bird to climb out, yet next morning it was gone.

The Musk Duck is one of the most solitary of water-fowl. Single birds are often seen, even on very small water-holes, and pairs are quite the usual thing. Oc-





MAP 111. Distribution of Musk Duck (*Biziura lobata*)

Sporadic record indicated by cross (X)







casionally small companies of three to six or seven are met with, and Littler (1910) says he once actually counted twenty-four together. North (1913) tells of having seen some hundreds in Hobson's Bay, Melbourne, but he says that they stayed about twenty yards apart and only came near each other through accident in diving.

ASSOCIATION WITH OTHER SPECIES. So solitary a bird as this could hardly be expected to associate with other ducks or water birds. Occasionally they will be found feeding in places frequented by Coots, and Captain S. A. White (1910) tells of an interesting case in which a Bald Coot (*Porphyrio melanonotus*), while being attacked by a hawk, took refuge near a Musk Duck, which, on the approach of the hawk, nonchalantly splashed him with water until finally the attacker gave up in disgust.

VOICE. So far as I can see, no satisfactory evidence has ever been adduced to prove that this duck utters any vocal sound. The "curious whistling sound" made occasionally by the male in the breeding season and mentioned only by W. H. D. Le Souef (1907) and by W. B. Alexander (1916) may very well be the male's courtship note, but it seems not yet certain whether the much-discussed *ponk* sound is really vocal. A grunting sound has also been attributed to the male by Miss Fletcher (in Mathews, 1914-15).

The trachea of the male is peculiar in having no syringeal bulla whatsoever, resembling that of the male Ruddy Duck in this respect. At the bifurcation of the trachea there is simply an ossified area notched in front and behind and with a narrow pessular bar below. The trachea itself is uniform in caliber throughout (W. A. Forbes, 1882).

FOOD. The food seems to consist largely of fresh-water shell-fish together with seeds of water-lilies and other aquatic plants. J. Gould (1865) gives mussels, leeches and aquatic worms as their diet, and on the Hawkesbury River, A. R. McCulloch found mud crabs (*Macrophthalmus*, sp.), inhabitants of estuarine mud-flats, in their stomachs. Miss J. Fletcher (in Mathews, 1914-15), writing of Tasmania, says the Musk Ducks seemed to be feeding on the white masses of frog-spawn.

They have been spoken of as feeding in such a way that it was surmised that they might be chasing fish up to the head of a creek, but it seems doubtful whether they eat fish at all.

COURTSHIP AND NESTING. Several observers have noted the pugnacity of the male during the mating period. Holden (in North, 1913) tells of one which attacked a domestic drake, drove him to the bank and killed him. Eylmann (1914), in an excellent account of the habits, mentions the fighting of the males during the mating



period. The attacks, he says, were made under water and the bird threatened would dive immediately when he saw the attacker dive. Heinroth (1911) says that the male kept in the Berlin Gardens was very pugnacious also and would dive at others like the Golden-eye. His very appearance would cause other water birds to seek the shore.

During the mating season these ducks go about in pairs, the female swimming behind the much larger male, right in the furrow of water which he makes (Eylmann, 1914). The display of the male is so violent and striking that it has been noticed and described many times. It is characterized chiefly by the turning of the tail-feathers well forward over the back and extending them fan-wise. Then, at frequent short intervals, the male shoots one (or both?) of his feet directly backward which causes a shower of water to be forced out behind three or four feet or more. At the same time the head is thrown back and by simultaneous movements thrust forward to the surface of the water, but apparently not under it. The exact sequence of all these movements is not at all clear nor is it certain whether the foot-thrust is alternate or simultaneous. It is equally uncertain what actually produces the resounding *plonk* or *ponk*, likened by Gould to the sound of a large drop of water falling into a deep well, a sound which accompanies the foot- and the head-movement. Some observers think this sound is vocal, but others attribute it to the foot-thrust or the slap of the tail on the water. Milligan (1902) and M. A. C. Fraser (1903) say that the male makes the noise whilst "immersing" the head. The thrusting down to (or is it under?) the water appears to be simultaneous with the foot-thrust and the "swishing" of the tail.

This is one of the most interesting as well as complicated displays seen in any duck. It can hardly be denied that it has a direct relation to that of the other stiff-tailed ducks (Ruddy Ducks) and it may even be argued that there is something in common with the foot-thrust of the Golden-eyes. It appears, too, that the dependent pouch is inflated or distended during sexual display.

Another peculiarity of the male during the nesting season is the strong musky odor which it emits. This has been noticed for a long time, but so far as I know its source has never been determined. In Vancouver's Voyage (vol. 1, p. 52, 1798) there is the first account of the capture of one of these ducks, in October, 1791, in King George Sound, West Australia: "A very peculiar one [duck] was shot, of a darkish gray plumage, with a bag like that of a lizard hanging under its throat, which smelled so intolerably of musk that it scented nearly the whole ship." J. Gould (1865) says that specimens killed in the breeding season retain the odor for years.

The nesting period extends from August to December or January (Littler, 1910; North, 1913; Mathews, 1914-15). The nest is nearly always in the thickest beds of flags, placed only a few inches above the water and often roofed over by the arching





DOWNY YOUNG  
BLUE OR MOUNTAIN DUCK  
MUSK DUCK







rushes. It is thought that this arching is helped out by the bird itself. White (in Mathews, 1914-15) says he has found some nests of the rudest construction in very exposed positions. Entirely different situations have been described but these must, I think, be very exceptional. J. Gould (1865) speaks of stumps of low trees being used, and W. H. D. Le Souef (1907) says they sometimes nest on the shore in hollow logs or similar places! Miss Fletcher (1909; and in Mathews, 1914-15) notes three instances where, in Tasmania, the Swamp Hawk (*Circus gouldi*) made its nest upon the nest of the Musk Duck, after the latter had finished incubation. She states that the Musk Duck lays an egg every day and as a rule sits as soon as the second egg is laid. When disturbed, the female dives from the mouth of the nest straight into the water. In one reed-covered lagoon, only about two acres in extent, she found at the end of November eleven nests with hatched egg-shells. Never once was she fortunate enough to see the ducklings, which shows how retiring they must be.

The normal clutch certainly numbers only two or three eggs. It seems probable that anything over three is the work of two females. Mr. Charles Barrett writes me that he has heard of four at times and rarely five, while White (in Mathews, 1914-15) claims that it is "not uncommon" to find six. The eggs are coarse-grained, slightly granulated and of a dingy greenish white clouded with pale olive. They measure from 75-85 mm. in length and 51-54 mm. in breadth (Littler, 1910; North, 1913; Mathews, 1914-15). A single clutch of three of these enormous eggs turns the scale at one and one-half pounds, and two other sets of two eggs weighed exactly a pound each (Fletcher, in Mathews, 1914-15).

The incubation period is unknown. The male stays in the vicinity of the nest while his mate is sitting and accompanies the female with the brood. "On two occasions," writes Mr. Edwin Ashby (in Mathews, 1914-15), "we surprised a little one only recently hatched and were much interested in seeing the little fellow swim at its utmost speed to the side of its father and then clamber up on his back and go off pig-a-back." J. Gould (1865) also says that when pursued the young mount the back of their parent, who immediately dives with them to a place of safety.

STATUS. Some of the earlier writers considered this duck extremely rare (Breton, 1834). Most of the recent Australian naturalists speak of it as common in many widely separated localities. A. C. Stone (1912) says he saw hundreds on Lake Boga, Victoria, and at Port Phillip Bay, Victoria. Mr. Charles Barrett writes me that he sees the Musk Duck every year, sometimes even in large numbers. North (1913) tells of seeing hundreds on Hobson's Bay, Melbourne, and in Corio Bay, Victoria. S. A. White (1918) found them very common on Lake Victoria, on the lower Murray, and W. B. Alexander (1921) writes that in the Swan River district of West Australia they are very plentiful. Owing to drainage of lagoons and swamps in southeastern New South Wales along the coastal district they are said to be getting rare. A few



are still seen near Tilba Tilba on the south coast (H. V. Edwards, 1924). Legge (1905) reports it as abundant on Great Lake, Tasmania.

The flesh is so poor that the ducks are not shot for food. It is not of course a "sporting" duck and as far as known its status has not changed much in recent years. The late Mr. D. Le Souef sums up the situation in a letter to me when he says that the species is widely distributed but not plentiful. It is well able to look out for itself and should persist for a long time to come, at least until its nesting haunts are obliterated by the hand of man.

**ENEMIES.** This species is probably little menaced by the recently introduced fox and domestic cat, because usually it builds its nest over deep water in places inaccessible to these vermin. Its huge size protects it absolutely from predatory birds, as remarked by S. A. White (1910).

**DAMAGE.** None.

**FOOD VALUE.** The flesh is never used for food and is coarse and bad tasting. The male smells strongly of musk during the breeding season, and it is said that the bird can often be detected by this odor alone (Mellor, in Mathews, 1914-15).

**HUNT.** These birds are not shot for sport simply because they are almost never seen on the wing. They are such nimble divers that they are well able to take care of themselves on the water. Many writers have spoken of the great difficulty in shooting specimens.

**BEHAVIOR IN CAPTIVITY.** The first live specimens imported to Europe came to the London Gardens in 1882, but they only lived two to three months (P. C. Mitchell, 1911). Miss Hubbard (1907) found that Mr. Jamrach imported three pairs between 1903 and 1904, at £10 a pair. The Berlin Gardens had one male which lived six years (Heinroth, 1911). Heinroth says nothing of this bird carrying out display attitudes but says that in swimming, the tail-feathers were dragged on the water, while in diving the tail seemed to be used to control depth. The bird was very quarrelsome and had the curious Golden-eye habit of diving at other birds under water. He heard no sound whatsoever from this bird, nor did he ever see the peculiar pendent lobe used in any way.



*SUBFAMILY MERGANETTINÆ*







### SUBFAMILY MERGANETTINÆ

THIS subfamily at present includes three peculiar genera of ducks with somewhat compressed bills. Their special habitat seems to be quick-running mountain streams. Two isolated members, — *Salvadorina* and *Hymenolaimus*, — are confined to the New Guinea archipelago and New Zealand respectively, while a third genus, — *Merganetta*, — is found in the Andean chain of South America, where two chief types occur with local variants. The external characteristics of these three genera are listed in the following key, based on that of Salvadori (1895):

- A. Edges of upper mandible bent inward toward the tip and furnished with prominent lamellæ; tail-feathers moderately broad.
  - a. Edges of upper mandible not soft at the tip; wing with a distinct speculum.....*Salvadorina*
  - b. Edges of upper mandible soft at tip; wing without a speculum.....*Hymenolaimus*
- B. Edges of upper mandible not bent inward toward the tip and not provided with prominent lamellæ; tail-feathers stiff and with narrow webs; a prominent carpal spur.....*Merganetta*









SALVADORI'S DUCK







# SALVADORI'S DUCK

*SALVADORINA WAIGIUENSIS* ROTHSCHILD AND HARTERT

(Plate 89)

## SYNONYMY

*Salvadorina waigiensis* Rothschild and Hartert, Novitates Zoologicae, vol. 1, p. 683, 1894.

## VERNACULAR NAMES

*English:* Salvadori's Duck, New Guinea Duck.

## DESCRIPTION

ADULT MALE AND FEMALE: Whole head and neck blackish brown to nearly black, but the feathers with narrow, pale edges. Mantle, scapulars, back, rump and upper tail-coverts jet black with a slight green iridescence; all the feathers prominently barred with white. Tail dark brown, middle feathers very long and pointed. All of the breast and abdomen buffy white, almost pinkish on the upper breast, but the sides and flanks barred and mottled with black. Under tail-coverts like the abdomen, but with prominent black spots, which encroach more or less on the lower abdomen. Upper wing-coverts black, barred with narrow white lines, except the last row of the greater coverts which are white at the tips, forming a white bar anterior to the speculum. Speculum deep purplish black on the outer part and iridescent green on the inner part, this last formed by the green at the outer webs of two or three innermost secondaries. The speculum is framed posteriorly by a broad white band on the tips of the secondaries. Primaries uniform dark brown. Under wing-coverts black, with white bars and edges, except the central ones which are nearly all white; axillars white, with a few brown spots near the tips or along the shaft.

Iris red (or brown) (?). Bill yellow, or yellow tinged with brown. Legs and feet yellow to orange yellow (specimen labels).

Wing 190–199 mm.; bill 35–39; tarsus 40–44.

IMMATURE SPECIMENS: Not examined.

YOUNG IN DOWN: Not examined. Above brown, wing and rump posteriorly edged with white, tips of tail brownish gray; a broad superciliary band, encroaching in front on the forehead, and sides of head and neck white; a black stripe from the hinder canthus of the eye to occiput; bill, legs, and feet blue; nail of bill and nasal region horn yellow (De Vis, 1897).

REMARKS: Pectinations on the upper mandible are numerous and well developed, projecting below the edge of the culmen. The edges of the upper mandible are thin and flattened. The wing carries a very blunt carpal spur.

## DISTRIBUTION

THE type of this genus and species was a specimen from the collection of Mr. Bruijn of Ternate labelled “ ♂ , Waigeou Papœasie ” (Waigi Island) (Rothschild and Hartert, 1894); all later specimens



have been taken in the mountains of eastern British New Guinea. De Vis (1897) has recorded it breeding on Mt. Scratchley at an altitude of 12,200 feet, September, and Rothschild and Hartert (1907) have recorded others from the Aroa River. The British Museum now possesses specimens taken on Mt. Albert Edward, on the Mambare River (July) and at Keveri, all in the same region. It was not found in Dutch New Guinea by members of the British Ornithologists' Union Expedition in 1910, 1912 and 1913.

*Note:* The type locality, Waigiu, has been doubted, so Dr. Hartert writes me, merely because no other specimens from there have been brought to light. Mr. Bruijn's localities were generally correct. He had no communication with southeastern New Guinea and there were specimens of other birds, undoubtedly from Waigiu, in the same collection. The mountains of that island have not been sufficiently explored and the original locality must be retained pending further investigation.

### GENERAL HABITS

THIS, the last to be brought to light and perhaps the most interesting of the peculiar anatine birds of the world, is still practically unknown. Even to-day it is represented by very small groups of specimens in the Tring Museum and the British Museum and a single specimen in the Museum of Comparative Zoölogy, received by exchange from Tring.

As Rothschild and Hartert (1894) say, there is no near ally of this duck in New Guinea and it resembles in a superficial way the curious Torrent Ducks of South America. No actual work on the anatomy of Salvadori's Duck has yet been done and it remains to be determined what its relationships are.

The only habitat, so far as known, aside from the original Waigiu Island specimen, is the mountain streams of eastern New Guinea up to 12,200 feet, although some were obtained at much lower levels, down to as low as 1800 feet. De Vis described the eggs as of a uniform creamy gray, measuring 55.5 by 42 mm.



BLUE OR MOUNTAIN DUCK  
*HYMENOLAIMUS MALACORHYNCHOS* (GMELIN)

(Plates 88, 90)

SYNONYMY

*Anas malacorhynchos* Gmelin, Linné's Systema Naturæ, ed. 13, vol. 1, pt. 2, p. 526, 1789.

*Rhynchaspis malacorhynchos* Stephens, General Zoology, vol. 12, pt. 2, p. 123, 1824.

*Malacorhynchus forsterorum* Wagler, Oken's Isis, p. 1235, 1832.

*Malacorhynchus membrinaceus* Eyton (in part), Monograph Anatidæ, p. 136, 1838.

*Hymenolaimus malacorhynchus* G. R. Gray, Ann. Mag. Nat. Hist., ser. 1, vol. 11, p. 370, 1843.

*Hymenolæmus malacorhynchus* Bonaparte, Comptes Rend. Acad. Sci. Paris, vol. 43, p. 651, 1856.

*Fuligula (Hymenolæmus) malacorhyncha* Reichenow, Ornith. Centralbl., 1882, p. 5.

VERNACULAR NAMES

*English:* Blue Duck, Mountain Duck, Soft-billed Duck.

*German:* Weichschnabel Ente.

*Maori:* Whio or Wio.

DESCRIPTION

ADULT MALE: General color of the whole bird lead blue, somewhat more olive-tinged on the crown of the head and rather dusky on the lores. Breast and upper abdomen spotted with rusty red or chestnut formed by wedge-shaped red patches at the tips of many of the feathers. Rest of lower side like upper side, but the blue tint paler. Wing lead blue like the mantle and scapulars except for four or five longitudinal black lines, formed by the black edges of the inner secondaries. No speculum present. Under wing gray-blue like the rest except for a few rusty-colored feathers among the central coverts.

Iris bright yellow (Buller). Bill, according to Buller, white horn-color, with the tip and the soft lateral membrane black. Legs and feet dark brown (Buller).

Wing 235–242 mm.; bill 46; tarsus 48–51.

ADULT FEMALE: Not so large as the male and said to have less chestnut on the breast and little or no olive tinge on the crown. My series is not sufficiently large or well enough sexed to bring out any plumage differences between the male and female. It seems to me very doubtful whether any differences exist between fully adult males and females.

IMMATURE SPECIMENS: "General plumage lighter, and the underparts whitish; the green gloss which pervades the plumage of the upper parts in the adult almost entirely absent; hind head and nape dull cinereous brown; breast obscurely spotted with dusky and brown, sometimes barred with chestnut at the insertion of the wings; under tail-coverts dull-rufous brown" (Buller).



**FLEDGLING:** "The colors are those of the adult but paler. The long, soft, white down is still present on the throat and lower side of the cheeks, whilst broken or irregular lines of the same proceed from the frontal base and from the sides of the upper mandible, and become scattered beyond the eyes. The dull olive-green down, with long disunited filaments, still adheres to the crown and other portions of the upper surface, being most pronounced immediately above the tail. The bill is slaty brown (in the dried specimens), the terminal points of both mandibles and the serrated edges being dull yellow" (Buller).

**YOUNG IN DOWN** (see Plate 88): The peculiar form of the adult bill is well seen even at this age, with its soft appendage. The body coloring is very remarkable. The upper side is a dull gray-green with white patches on the wing-rudiments. The lower surface is snow white and the white comes up rather high on the sides of the breast and over the whole face and neck, to the level of the eye. Above each eye there are two prominent white spots, one just above it, and a longer one farther back. There are also two minute white spots on each side of the forehead.

Iris black. Bill slate blue, with the nail yellow. Legs and feet olive-brown (specimen in British Museum from Geraldine, New Zealand, 1913).

### DISTRIBUTION

**THE Blue Duck** is confined entirely to the mountain streams of New Zealand, inhabiting both islands, from Otago in the south to Auckland in the north, possibly even farther (Finsch, 1870a, 1872, 1882, p. 400; Potts, 1870, 1871; Travers, 1872; Fulton, 1908; Ogilvie-Grant, 1905b; McLean, 1907; Buller, 1888, 1905).

There is a rather doubtful record of its occurrence on Hanfield Inlet, Auckland Islands, in February, 1883 (Waite, 1909).

### GENERAL HABITS

**THE** relationships of this duck are only vaguely indicated, for it certainly has no near allies anywhere in the world. Its soft bill, curious feeding habits and utter stupidity indicate a degree of specialization that will almost certainly contribute to its extermination in the near future unless some carefully guarded sanctuary can be fortunately provided.

The habitat can hardly be described more picturesquely than in Buller's own words (1888): "Far up the mountain-gorge, where the foaming torrent, walled in on both sides, rushes impetuously over its shingle-bed, surging around the huge water-worn boulders that obstruct its course, and forming alternately shallow rapids and pools of deep water, there the Blue Duck is perfectly at home." Occasionally, however, when the mountain streams are swollen, they will drift down to the very mouths on to the lakes (Travers, 1872) and Buller quotes a certain Mr. Reischek who met with it on the west-coast sounds, that is on salt water. In any case this must have been very exceptional.

**WARINESS.** New Zealand writers vie with each other in describing the tameness and "stupidity" of this duck. It certainly is by far the least shy of the New Zealand *Anatidæ*, perhaps of all ducks. It can easily be approached within a few feet and





BLUE OR MOUNTAIN DUCK







only then will it slide off a rock and drift down stream. Some travelers tell of knocking them over with sticks or stones (Buller, 1888; Fitzgerald, 1896, p. 347; etc.). Finsch (1882) says that several can be shot before the rest will rise, and W. S. Green (1883) told how, in order to save ammunition, he and his companions used to pelt them with stones until several were huddled together and could be gotten with one shot. They are as confiding after capture as before it. One female which Buller caught and brought to Wellington in a canvas bag, on being taken out some hours later sipped water from a drinking cup in a "most unconcerned way." Placed in a cage with her nest and eggs, she immediately claimed possession, and continued to sit with few interruptions for several days. Buller adds that he does not know of any species of duck that would have resumed incubation under similar conditions.

**DAILY MOVEMENTS.** Buller (1888) describes this bird as somewhat nocturnal in its habits, becoming more active toward nightfall, when it sometimes makes a comparatively long flight from one torrent to another.

**GAIT.** Potts (1871) says they are loath to land and when compelled to do so their progress is not rapid; in fact, they impress one by their helplessness. Nevertheless they are often seen perched on the rocks of streams and are very adept in climbing over the slippery surfaces, using their wings, which are equipped with a hard knob (Travers, 1872; Buller, 1888).

**SWIMMING AND DIVING.** On the water they are, of course, exceedingly agile, and can make good progress, carrying the head low and somewhat forward, and the tail well elevated. Several writers have noted their ability to turn around without losing ground, even in the rapids, as though they were fixed on a pivot (Potts, 1871; Buller, 1888). Most observers agree in saying that they seldom dive, though they can do very well in this respect when wounded and a certain Mr. De Lautour says that eight of these ducks which stayed near his camp for two months used to spend the whole of every morning diving after food, "at which they were even more expert than the Shag" (Buller, 1905).

**FLIGHT.** The Mountain Duck will not take wing if it can help it, and prefers to escape danger by dropping down the torrent or, according to W. S. Green (1883) by climbing out on land where its coloring makes it hard to see. Nevertheless, when once up they seem to fly well enough, at least for a short distance (Travers, 1872; Buller, 1888).

**ASSOCIATION WITH OTHER SPECIES.** As might be expected from its other habits this duck is not very sociable, being met with usually in pairs or in small groups.



Potts (1871), however, says that in winter they congregate in flocks of moderate size.

**VOICE.** Two calls have been attributed to this duck. One, the commoner, is a shrill whistling note which can be heard over the noise of the loudest cataract (Travers, 1872; Buller, 1888). Buller (1888) also refers to a "whirring call" which he later (1905) describes as a "low rasping" note, like the sound produced by the drawing of an object quickly against the teeth of a large comb. This last note he attributes to the male, while he considers the whistle to be the call of the female. It seems to me far more likely that the reverse is correct, but this is merely a guess on my part. Since the earliest writers we have almost no good field-notes on this very well worthwhile bird.

**FOOD.** Haast (1868) reports finding remnants of berries and grass seeds in a stomach. Buller (1888) says that in stomachs taken in autumn he found a species of caddis-worm, which he believes is the chief article of diet. The worms varied in size, but none over one inch in length. In only one case did he find the shell or case in the duck's stomach, and he suggests that the fleshy membrane which fringes the bill of the bird may be of service in dislodging the worm from its stone-covered cell.

Travers (1872) says they usually stand on a stone in the middle of some rapid, from which they pick up any stray article of diet that is carried by; they are also seen searching for food below the water in rapids. Perhaps the pivoting action already mentioned also has something to do with feeding.

**COURTSHIP AND NESTING.** The nesting season is evidently rather prolonged, for Potts (1870), who describes it as an early breeder, states that he has seen young broods swimming about by the end of September and that he has found nests and eggs in October and November. Travers (1871) gives November and December as the breeding months.

There seems to be a good deal of variety in the position chosen for the nest. Ordinarily it is in a hole in the bank, concealed from view by overhanging sprays of alpine veronicas (Potts, 1870), but nests have been found on snow-grass tussocks near streams (Potts, 1871), and even in (hollow?) trees twenty to thirty feet from the bank (Fulton, 1908), or in hollow logs twenty yards from the water (Buller, 1905).

The nest itself, when in the open, is made of grass, and in any case seems to be well lined with down (Potts, 1870, 1871). The clutch is small and Travers (1872) says he has never seen more than six in a brood. A nest found by Buller (1905) contained only four eggs. Potts (1870) mentions one with five. The eggs themselves are of a pale cream color, with a greenish tinge which washes off. They measure 57.3–71.0 mm. by 38.0–48.3 mm. (Potts, 1870; Buller, 1888, 1905).



A good deal has been written about the behavior of the parents when surprised with their young. "They certainly exhibit much less craft as well as energy for the protection of their offspring than any other duck," says Travers (1872); "with them there is little, if any, attempt at concealment of the young, none of the ruses are made use of, which, with the Paradise Ducks, often prove so successful in misleading their enemies; usually, they simply drop down the rapid, trusting apparently for escape to the turbulence of the stream — an asylum safe enough from most, if not all, indigenous persecutors, but not from the settler's dog; they seem loath to land, and if compelled to do so, their progress is not very rapid, in fact, they impress one with an idea of their helplessness. The duck marches in front, with her low wailing call, the small brood follow, whilst the drake protects the rear, or rather offers himself as the first victim to the pursuer." According to Hill (in Buller, 1888) the young are very active in the water and dive persistently. If closely pursued they take to the bank and conceal themselves.

STATUS. So tame and confiding a bird as the Blue Duck is absolutely doomed unless it is effectively protected. In the past it has been comparatively safe because its mountain fastnesses were rarely penetrated. But as the settlements move inland and civilization takes possession of the wilds the chances of this bird rapidly diminish. Buller (1905) tells of a locality (the Manawater Gorge) in which the species used to be common in the old days, but now a road and a railroad have been built through and no trace of the bird remains. In the early days judging from the writings of Potts, Travers and others, this duck was by no means rare in suitable localities. Now it has disappeared from many of them and the number of places in which it is still safe is rapidly decreasing. Fulton (1908) says that in North Canterbury it may still be found in great numbers. Fortunately I have some valuable recent information from Mr. J. S. Myers of Wanganui, New Zealand, at present carrying on his studies at Harvard University. It still exists, he says, in both islands but more commonly in the South. It is protected by law but such laws are not as yet effective for they are not backed up by government game rangers. The only persons available for enforcement of laws are officers appointed by the various acclimatization societies and these societies are inclined to take more interest in introduced species than in the far more interesting native ones. Just recently, however, a National Bird Protection Society has been formed. But speaking generally, Mr. Myers feels certain there is no danger of extinction and he tells me of one place where the bird actually increased in the past few years. With the permanent segregation of forest reserves he thinks its future should be assured. It can be seen, even to-day, not more than thirty miles in a direct line from Wellington. We do not know anything definite about the possible effect upon this duck of introduced "vermin" such as weasels, stoats, ferrets and rats, but with such a confiding species there is always a danger in any radical changes of the environment.



In a recent paper on the status of native New Zealand birds Mr. Myers (1923) suggests that the Blue Duck may offer by its very tameness "altogether too tempting a mark for Sunday idlers," and this may explain local disappearance. Mr. Guthrie Smith (1921) believes on the other hand that it will forever maintain itself in the almost inaccessible gorges which form such an attractive feature of the Hawke's Bay region.

I might also mention a letter from Mr. Alfred Philpott of the Cawthron Institute of Nelson, in which he assures me that this most interesting species is in no danger of extinction. "In the rough forest mountain country," he says, "the Blue Duck is quite numerous still, and as this type of land is never likely to be settled, or even to be visited except by an occasional Rambler, the birds' prospects are satisfactory. A few years ago I had a tramp in a piece of unexplored back country. Our course for a couple of days lay along the side of a mountain torrent and at every cascade the shrill whistle of the Blue Duck greeted us; and the stream was little else than cascades."

FOOD VALUE. No information. It is eaten for food.

HUNT. Travelers in the highlands of New Zealand have most of them hunted this duck, often using only sticks or stones to kill it. Captain Mair (in Buller, 1888) tells how the expedition against Te Kooti, the Maori leader, sometimes took forty or fifty in one day in the Vrewera country.

BEHAVIOR IN CAPTIVITY. Buller (1888) quotes Captain Mair, who kept a pair of these ducks at his camp for two years. They associated freely with domestic ducks and established themselves in the cooking hut. They showed great fondness for potato and rice and would readily take food from the hand. Finally they disappeared. The Acclimatization Gardens at Christchurch, New Zealand, also kept several pairs for some months. They became very tame and were finally sent to the London Gardens. Buller (1905) himself kept several. He found them shy at first but very adaptable, taking readily to a diet of cooked potato and rice.

The London Gardens received a first specimen in May, 1876. Unfortunately it arrived in an exhausted state and soon died (Proc. Zool. Soc. London, 1876, p. 463). In May, 1884, two pairs were received. These lived two years and eleven months on the average, the longest living six years (P. C. Mitchell, 1911). Nothing has been recorded regarding their behavior.

HYBRIDS. A wild hybrid between this species and the Australian Black Duck (*Anas superciliosa*) is listed by Poll (1911).



# CHILEAN TORRENT DUCK

*MERGANETTA ARMATA* GOULD

(Plate 91)

## SYNONYMY

*Merganetta armata* Gould, Proc. Zool. Soc. London, 1841, p. 95.

*Raphipterus chilensis* Gay, Historia fisica y polit. de Chile, atlas, pl. —, 1844.

*Merganetta chilensis* Des Murs, Icones Ornith., pl. 5, 1845.

*Rhaphipterus chilensis* Des Murs, Gay's Historia de Chile, Zool., vol. 1, p. 459, 1848.

*Biziura armata* Schlegel, Mus. des Pays-Bas, Anseres, p. 12, 1866.

*Rhaphipterus armatus* Sundevall, Meth. Nat. Avium Tentamen, p. 150, 1872.

*Merganetta andina* Blaauw, Notes Leyden Mus., vol. 35, p. 27, 1912.

## VERNACULAR NAMES

*English:* Spur-winged Duck, Chilean Torrent Duck.

*German:* Gebänderte Borstensäger.

*French:* Mèrganette armée.

*Spanish:* Pato tortuga, Pato de la cordillera, Choromoro (Tucuman).

Additional synonymy under Geographical Races.

## DESCRIPTION

**ADULT MALE:** Head and neck white except for the crown and a broad band down the hind neck, which are black. A black band on each side starts at the eye and runs back all the way down the hind neck, sending off a short connecting band to the central hind-neck patch. Below the eye a broad transverse band, or patch, connects with the black chin and throat, and a narrow black line which runs up along the base of the culmen. Upper side as in *Merganetta a. frænata*, the feathers of the mantle and scapulars long and pointed, black along their centers, and prominently edged with white. Lower back, rump and upper tail-coverts lead color, the latter banded with narrow black and white lines. Tail brown, with the shafts of the feathers whitish above and pure white below. Fore neck and breast black, fading into the rufous color of the abdomen, many of the ruddy feathers having black streaks along their centers. Sides and flanks blackish, mixed more or less with rufous; under tail-coverts blackish, stained with rufous and gray. Carpal spur long and sharp. Wing-coverts blue lead-color, except the greater ones which have a narrow white band at their tips, anterior to the speculum. Speculum, formed by the outer webs of the secondaries, bright metallic green, banded behind by a broad white band. Primaries brown, tertials lead blue like the outer wing-coverts. Under wing-coverts and axillars grayish.

Iris brown (chestnut brown). Bill red. Legs and feet dull red, with the webs blackish.

Wing 182–185 mm. (measurements of many British Museum specimens); bill 28–30; tarsus 40–42.

*Note:* I have seen two adult males in full plumage (specimens without date) which were growing new primaries. There was no indication of an "eclipse" plumage.



ADULT FEMALE: Crown lead color. Posterior part of cheeks, sides of neck and region between eye and bill with narrow transverse black and gray bands. Anterior part of cheeks, chin, throat, breast, abdomen and under tail-coverts bright cinnamon color. Mantle and scapulars with the feathers black, edged with bluish gray. Back, rump, upper tail-coverts and tail as in the male. Wing like the male's only with the spur a little shorter.

Iris brown. Bill red, except along the ridge of the culmen where it is brown or blackish. Legs and feet dark or dull red, with the webs black. Size somewhat smaller than the male.

Wing 165 mm.; bill 28; tarsus 39.

MALE AND FEMALE IN FIRST (OR JUVENAL) PLUMAGE (see Plate 91): Somewhat like the adult female on the upper side, but paler. Upper parts lead gray, the sides of the head, below the eye, white. Chin, throat, breast and abdomen white but the sides and flanks broadly barred with white and gray-brown. Wing and tail nearly as in adult. Tip of bill black; edge of lower mandible red; inner side of tarsus, top of feet and bottom of web yellow. Outer side of tarsus black (J. R. Pemberton, collector).

IMMATURE MALE: At a somewhat later stage black feathers appear on the head, the beginning of the black crown and black face-pattern of maturity. It seems doubtful whether full plumage is assumed much before two years of age, but this is merely a guess. I do not think that the young male passes through a female stage with cinnamon-colored under parts, as has been suggested, but here again I may be wrong.

IMMATURE FEMALE: Specimens showing transition from the juvenal white-bellied stage to the adult-female plumage are occasionally seen. Sometimes only a few old, worn, white feathers are found on the lower parts.

YOUNG IN DOWN: Upper parts pale brown, under parts white; sides of the head white, with a brown band from behind the eye to the occiput; a white patch on the interscapular region; two white bands from the scapular region along the sides of the back and rump to the sides of the base of the tail; wings pale brown, broadly edged with white on the posterior edge; tail-feathers much developed, whitish, freckled with brown, and with a sub-apical brown band and a white one at the tip (Salvadori, 1895).

## DISTRIBUTION

NOTHING definite is known of the extent of range of this rare Andean duck. About all we can say is that it inhabits the high mountain regions of central Chile and the neighboring western parts of Argentina. It has been reported from the Chilean Andes by a number of observers (Gay, 1847; Bibra, 1855; P. L. Sclater and Salvin, 1876; James, 1892; Quijada, 1910; etc.), but very few definite localities are given. The British Museum has a specimen taken as far north as Colchagua and Blaauw (1916a) met with the species about Lake Todos los Santos and Puerto del Inca. In central Chile at Balala, east of Coquimbo in about latitude 30° south, it was taken by an expedition of the Field Museum of Natural History (W. H. Osgood, *in litt.*).

In Argentina specimens have been taken as far north as Santa Catalina in Jujuy (Bruch, 1904) and Cienaga in Tucuman (Lillo, *fide* Dabbene, 1910). Blaauw (1916a) saw a specimen flying over the Rio Mendoza and according to C. S. Reed (1916) it has also been taken in Mendoza near Potrerillos. These are probably exceptional occurrences, for the real home of this Torrent Duck seems to be farther south. Thus Blaauw (1916a) saw it on Lake Nahuel Huapi and shortly after Mr. J. L. Peters (MS.) met with it on the western side of the same lake in February. The La Plata Museum has a specimen from Neuquen in the same region (*fide* Dabbene, 1910) and Mr. Pemberton (*in litt.*) took specimens in March and April on the Rio Quemquemtren as well as at Bariloche, Rio Negro Pro-





CHILEAN TORRENT DUCK

Male

Immature  
Female







vince, and on Rio Chalala and Rio Epuyen in the Province of Chubut (Museum of Vertebrate Zoölogy, University of California). According to Dabbene (1910), Gerling has reported the species from Lago General Paz in western Chubut.

### GENERAL HABITS

WE know less of the natural history of the Andean Torrent Ducks than of any other group of the *Anatidæ*. Few nests have ever been found and observers as a rule get only a brief look at the birds in the field. In regard to the habits of this Torrent Duck I can do no better than quote a letter from Mr. J. R. Pemberton who collected a series on the east side of the Andes in Rio Negro and Chubut: "This species is one of the most interesting birds I have ever seen. It lives in the wildest streams and is never seen excepting on rocks in midstream or bobbing along in the torrent or flying back up-stream. They move down-stream and fairly jump out of the water to the steep up-stream side of a boulder, and stick exactly like a woodpecker on a tree, their stiff tails being their means of support. I never saw them in a stream which did not flow far too fast for them to swim up-stream, so they fly back. In a country where man is seldom seen and where all the other birds are as tame as birds in a city park these ducks are as wild as can be and I had to fairly stalk them to get a shot. Many I never recovered. I found that they ate mollusks including gastropods, from stomach examinations."

Two taken by H. B. Conover near the Argentine boundary on the Rio Nireguao had been feeding entirely on insects and their larvæ. He writes, "The birds are usually seen sitting on a rock in the middle of the stream, but they are very wary, and if they see any one approaching, slip off the rock and under water. They live only in the streams with the swiftest current, and often after they have disappeared from the rock, you do not catch sight of them again. They seem to fly very easily, as the female of this pair jumped when I shot the male; she did not seem to skitter over the water as deep-water ducks do, but sprang more with the action of a Teal."

Torrent Ducks apparently nest under overhanging rocks in cliffy places by the streams; possibly sometimes in caves or in holes in a clay bank. Mr. Conover says that in Misiones Province of Argentina he was shown a photograph by the collector Rodríguez, "of what was supposed to be" the nesting site of a pair of these ducks in Tucuman. The place was about seventy-five feet above a stream on the face of an unscalable cliff, the nest itself at the foot of a bush.

Bibra (1855) one of the earliest writers to mention them, says that they swim very fast, even against the rushing torrents. He, too, failed to recover most of the specimens he shot, and remarks that even when surprised they do not fly, but dive. Later on Robert Crawford (1884) wrote as follows about the valley of the Teno in Chile: "In its rushing waters we saw in several places birds with the most wonderful power of swimming I had ever observed in any class of divers. From time to time



they darted from the rocks into the boiling current, and issued from it on the opposite side of the stream with as much apparent ease as if their course had been through a pool of stagnant water. The facility with which, upon emerging from the river, they scrambled up the smooth-worn surface of the rounded stones was also marvellous. The natives told us they accomplished this by the aid of hooks with which their wings are provided, somewhat similar, I suppose, to the spurs on the wings of the horned plover and the crested screamer. I was unable, however, to obtain a specimen of these birds to verify the statement, as those that were shot were swept away, and lost to us in the foaming torrent." They certainly use their wings greatly to assist them in climbing, but this would prove nothing, as all birds of the duck family do so.

Mr. Blaauw (1912a) recently contributed the following note on eight which he saw in Chile: "They were sitting very upright, much like cormorants. When they saw me they jumped right into the seething water and although with their heads towards the fall of the water, managed to stay almost in the same place, looking at me all the while. After a time they swam to another rock, jumped upon it, jumped off again into the torrent, dived under to reappear at a small distance, and in the end hid themselves behind some other rocks. They did not attempt to fly as I got nearer." Later on, however, Mr. Blaauw saw one flying over the Mendoza River, Argentina, and Mr. J. L. Peters, who saw about six at the west end of Lake Nahuel Huapi where the mountain torrents drop into the lake, tells me that in flight they looked like cormorants, the wing-beats very rapid. Mr. Peters approached them in a gasoline launch and they got up a long way ahead.

Nobody seems to have heard these curious ducks utter any sound at all.

#### GEOGRAPHICAL RACES

##### CHILEAN TORRENT DUCK

##### *MERGANETTA ARMATA ARMATA* GOULD

*Merganetta armata* Gould, Proc. Zool. Soc. London, 1841, p. 45.

CHARACTERS: No transverse stripe between the eye and the black crown-patch. Lower abdomen not so black as in *M. armata frænata*.

DISTRIBUTION: High mountain region of central Chile and neighboring parts of western Argentina.

##### JAMES' TORRENT DUCK

##### *MERGANETTA ARMATA FRÆNATA* SALVADORI

(Plate 92)

##### SYNONYMY

*Merganetta frænata* Salvadori, Cat. Birds British Mus., vol. 27, p. 458, 1895.

##### VERNACULAR NAMES

English: James' Torrent Duck, James' Spur-winged Duck.





MAP 112. Distribution of Torrent Ducks (*Merganetta*)







## DESCRIPTION

**ADULT MALE:** Head and neck white except for the following black pattern. Crown and a stripe along the middle of the hind neck black. A transverse band over the eye, in one specimen not well defined, joins the pileum and another broader band passes across the cheek from the eye to the throat, which like the breast is black. This leaves a triangular white patch on the lores completely cut off from the white of the remainder of the head. Starting from the eye and running back along the hind neck until it merges with the sides of the mantle is a prominent black stripe. This stripe sends a branch to the black band on the hind neck which leaves the white superciliary stripe to meet its fellow of the opposite side at the occiput. Mantle, scapulars, tail and wing as in *Merganetta armata*. Breast like that of *armata*, but the black streaks on the lower parts are much more prominent. Lower abdomen and under tail-coverts blacker than in *armata*.

This subspecies is most like *Merganetta armata* but is distinguished at once by the presence of the transverse stripe between the eye and the black crown-patch.

Iris brown. Bill dull carmine, black down center of culmen. Legs and feet dull scarlet with the webs black (H. B. Conover).

Wing 175-180 mm.; bill 29; tarsus 42.

**FEMALE:** A specimen in collection of H. B. Conover, collected by him near the Argentine-Chilean border, Rio Nireguao, probably belongs to this species or race. I can see no difference between the above specimen and females of typical *Merganetta armata*.

Iris brown. Bill carmine, black down the center. Feet dull scarlet, webs black.

Wing 168 mm.; bill 28; tarsus 38.

## DISTRIBUTION

THE first specimen of this species recorded is the one in the British Museum taken in "central Chili" by H. Berkeley James. There is a second specimen there received from the Museo de La Plata, collected by Dr. F. P. Moreno in Valle Hermoso, February, 1897. This appears to be similar to the type. A pair from Casa Richards, Rio Nireguao (east of the mountains on the Argentine boundary and about south latitude 45°, west longitude 72°) taken by H. B. Conover, March 3, 1923, probably belongs here, but they are not very different from *Merganetta armata*.



# TURNER'S TORRENT DUCK

*MERGANETTA TURNERI* SCLATER AND SALVIN

(Plate 92)

## SYNONYMY

*Merganetta leucogenys* Sclater and Salvin (*nec* Tschudi), Proc. Zool. Soc. London, 1869, p. 157.

*Merganetta turneri* Sclater and Salvin, Proc. Zool. Soc. London, 1869, p. 600.

*Biziura turneri* Giebel, Thesaurus Ornith., vol. 1, p. 468, 1872.

*Rhaphipterus turneri* Reichenow, Ornith. Centralbl., 1882, p. 3.

## VERNACULAR NAMES

*English:* Turner's Torrent Duck, Turner's Spur-winged Duck, Cuzcan Torrent Duck.

*German:* Turner's Borstensäger.

## DESCRIPTION

**ADULT MALE:** Pileum and a band down back of neck black. A black stripe starts as a dot just in front of the eye and continues behind the eye all the way down the hind neck to the sides of the breast, sending off a short branch to join the hind-neck patch. This head pattern same as in *Merganetta garleppi*. Remainder of head white except for a narrow line along base of culmen. Mantle black and feathers of the scapular region black, with dark-brown edges. Back, rump and upper tail-coverts as well as sides of rump lead gray with narrow white and gray lines. Tail brown, with the shafts paler above and white below. Breast, abdomen, sides and flanks almost entirely deep glossy black, although in some specimens, perhaps varying in different localities, the abdomen in the center is dark reddish gray (Salvadori, 1895), the feathers with broad mesial black streaks. Vent and under tail-coverts black. Wings same as in *Merganetta armata*.

Iris brown. Bill red. Feet blackish red (C. Chubb, 1919).

Wing 186–192 mm.; bill 30–32; tarsus 40.

**ADULT FEMALE:** Similar to the female of *Merganetta armata* but the cinnamon color of the lower parts is a little paler in tone. Size somewhat smaller than male.

**FIRST OR JUVENAL PLUMAGE:** Apparently in this species, as in the others, both sexes go through the phase of plumage with the white breast and barred flanks and with the upper side somewhat like the adult female. Immature females which still have a few concealed barred feathers on the flanks were described by C. Chubb (1919).

**YOUNG IN DOWN:** Not described.

## DISTRIBUTION

**THE** only localities in which this species has so far been taken are Tinta (type) and the rivers of the Cuzcan Andes (P. L. Sclater and Salvin, 1869a) and Sumbay on the Rio Vitor (4000 meters), Province of Arequipa, Peru (C. Chubb, 1919).





JAMES' TORRENT DUCK

GARLEPP'S TORRENT DUCK—Male

TURNER'S TORRENT DUCK  
Female

Male







# GARLEPP'S TORRENT DUCK

*MERGANETTA GARLEPPI* VON BERLEPSCH

(Plate 92)

## SYNONYMY

?*Merganetta leucogenys* Boeck, Mittheil. Ornith. Verein Wein, 1884, p. 164.

*Rhaphipterus leucogenys* Reichenow (in part), Ornith. Centralbl., 1882, p. 3.

*Merganetta garleppi* von Berlepsch, Ornith. Monatsber., vol. 2, p. 110, 1894.

*Merganetta leucogenys garleppi* Menegaux, Bull. Soc. Philom., Paris, vol. 10, p. 222, 1909.

?*Merganetta berlepschi* Hartert and Venturi, Novitates Zool., vol. 16, p. 244, 1909.

## VERNACULAR NAMES

*English:* Garlepp's Torrent Duck, Garlepp's Spur-winged Duck, Bolivian Torrent Duck.

*German:* Garlepps Borstensäger.

*South American Indians:* Nawafito, Chullumpi.

## DESCRIPTION

**ADULT MALE:** Closely resembles the male of *Merganetta leucogenys* except that feathers of the back and scapulars have no, or very little brown on their edges. The mantle is much more streaked with white than in *Merganetta leucogenys* and a white area separates the dorsal black neck-stripe from the mantle. The lower surface is nearly similar in coloring although the middle and sides of the breast are much lighter and more streaked with white. It also resembles the male of *Merganetta colombiana* but the streaks on the lower parts are much darker and wider and the ground color of the same region is distinctly pinkish although not so red as in *Merganetta armata*. The upper side is nearly as in *Merganetta colombiana*, but the mantle is darker, mixed black and white, the tips of many feathers black and the sides nearly white; scapulars with the pale edges more silvery and less brown and the black centers of the feathers wider and more prominent. This bird has often been compared to *Merganetta armata*, but it is obviously very different in general coloration, as well as in the sharply defined face-pattern, both from that species and from *Merganetta a. frænata*. It is in fact nearer to *Merganetta turneri* than to *Merganetta armata*.

Iris brown (white according to C. Chubb, 1919). Bill red. Legs and feet red.

Wing 173-180 mm.; bill 28-32; tarsus 40-42.

**ADULT FEMALE:** Very closely resembles *Merganetta armata* and *Merganetta turneri* but it differs from *Merganetta colombiana*, according to Menegaux, as follows: the present species has the sides of the neck and the cheeks vermiculated with black and white. *Merganetta colombiana* is more orange-brown on the abdomen and paler than *Merganetta garleppi* and *Merganetta turneri*.

Iris red or hazel. Bill nearly black, red beneath. Feet red above, and black below.

**JUVENAL AND DOWN STAGES:** Not examined; young in down apparently not described.



## DISTRIBUTION

THE home of this species seems to be in the Andes of western Bolivia, where it has been found at Cocotal in March (von Berlepsch, 1894), at Cochabamba and Incachaca (von Boeck, 1884; Miller and Boyle, American Museum of Natural History). C. Chubb (1919) has recorded specimens taken on the Rio Blanco in northern Bolivia (1300 meters), P. O. Simons, collector.

Beyond the boundaries of Bolivia specimens have been taken near Yura in southern Peru (Mene-gaux, 1910) and in the Province of Tucuman, Argentina, at La Hoyada and Rio Vigos in July (Lillo, 1902) and at Rio Norco and Tucuman in May and June (Hartert and Venturi, 1909).

## GENERAL HABITS

WE know nothing about the life-history of this Torrent Duck. It has been taken as high as 15,000 feet and as low as 7000 or 8000 feet. It inhabits mountain torrents. A specimen from Rio Blanco, Bolivia (1300 meters), is similar to the single specimen in the British Museum, but is darker on the under surface, the dark pattern of the feathers being more extended and deeper in color.

*Merganetta berlepschi*, described as a new species from near Tucuman, in 1909, must apparently be included here but may prove to be a race of the present species.



# COLOMBIAN TORRENT DUCK

*MERGANETTA COLOMBIANA* DES MURS

(Plate 93)

## SYNONYMY

*Merganetta colombiana* Des Murs, Revue Zoologique, 1845, p. 179.

*Merganetta columbiana* Sclater, Proc. Zool. Soc. London, 1855, p. 164.

*Merganetta armata* G. R. Gray (in part), Genera Birds, Appendix, p. 28, 1849.

*Merganetta leucogenys* Bonaparte (in part), Comptes Rend. Acad. Sci. Paris, vol. 42, p. 652, 1856.

*Biziura armata* Schlegel (in part), Mus. des Pays-Bas, Anseres, p. 12, 1866.

*Rhaphipterus leucogenys* Reichenow (in part), Ornith. Centralbl., 1882, p. 3.

## VERNACULAR NAMES

*English:* Colombian Torrent Duck, Colombian Spur-winged Duck.

*German:* Colombischer Borstensäger.

## DESCRIPTION

**ADULT MALE:** This species, which is much the lightest-colored of all the Torrent Ducks, is perhaps nearer to *Merganetta leucogenys* than to any other. The head-pattern is the same as it is in *Merganetta turneri*, *garleppi* and *leucogenys*. The mantle is slate-colored in the middle, without prominent black or light-colored streaks, and shades off to nearly white on the sides of the mantle and breast. The scapulars have black centers and brown or pale-gray edges, while the back, rump, upper tail-coverts and tail are the same as in related species. Tail somewhat lighter-colored than in *Merganetta leucogenys*. Breast, abdomen and under tail-coverts white, the feathers with narrow black centers; sides and flanks light-colored like the breast. Wing as in other Torrent Ducks.

Iris brown. Bill orange-chrome, black down the ridge of the upper mandible. Legs and feet dingy yellow (W. Goodfellow, collector) (I think the bill is probably red in life).

Wing 150-164 mm.; tarsus 38-41; culmen 29-31.

*Note:* I can see no differences in specimens covering a great range of country: northern Ecuador (Papallacta Lake, 1200 feet, E. J. Brook, 1914), Venezuela and the Santa Marta region of Colombia. This series is in the British Museum.

**ADULT FEMALE:** Similar to *Merganetta leucogenys* but all of lower parts much lighter cinnamon color, almost buff, while this color extends up and covers the whole area of the face, which in *leucogenys* and *armata* is lead gray. The upper surface is nearly similar to that of *Merganetta leucogenys*.

Iris brown. Legs and bill according to Mr. Holman's specimen pinkish red. According to other collectors (W. Goodfellow) the bill is dingy orange-yellow, black down center of upper mandible, and the feet black! I doubt much whether these colors were present in fresh-shot specimens. Certainly the legs and feet are not black.

Size: smaller than male. Wing 132-140 mm.; tarsus 36-37; culmen 25-27.



YOUNG (JUVENAL) MALE AND FEMALE (see Plate 93): No face-markings. Pileum and dorsal side of neck gray. Rest of upper side somewhat as in female, but the edges of the feathers olive-gray. Wing as in male, but speculum not so brilliant. Lower side pure white while the sides and flanks are barred with wavy black and white lines. Tail barred white and black irregularly. Both sexes go through this stage of plumage. Wing of young males, 100–145 mm.

YOUNG WITH FIRST FEATHERS appearing on scapulars, flanks and pileum (Fleming collection): The terminal points of the first tail-feathers have not yet dropped off and the tail is 95 mm. long. The terminal barbules are 33 mm. The downy face-pattern is obscured by new feathers; pileum slate-gray. New scapulars black with slate-gray hair-like tips. Flank feathers barred black and white. Downy white areas on the mantle and down each side of back still show distinctly. The whole lower side is covered by very fluffy white down, long and thick.

REMARKS: All the Torrent Ducks show a curious persistence of the downy tail-feathers projecting from the end of the new (juvenal) tail. These remain firmly attached and are apparently never separated from the ends of the juvenal tail, but simply wear off gradually. Some young males in the collection of the American Museum of Natural History show this well. The primitive barbules are 35 mm. long and the whole tail over 140 mm. in length. Beebe (1914) called attention to this peculiarity among the Torrent Ducks. He attributed some special useful function to these attached barbules. They might possibly aid in climbing upon rocks.

### DISTRIBUTION

THE range of this species of Torrent Duck extends over Ecuador, Colombia and western Venezuela. In general it is found only in the higher Andean parts of these countries. In the mountainous parts of Ecuador it is not an uncommon bird and a considerable number of specimens have been recorded, particularly from the Central Andes (P. L. Sclater and Salvin, 1876; C. Chubb, 1919; Lönnberg and Rendahl, 1922; American Museum of Natural History). Its status in Colombia appears to be similar. F. M. Chapman (1917) states that it is not uncommon on the rapid rivers of the subtropical zone. He records specimens from Salento, Rio Toché and El Eden. Both the British Museum and the American Museum of Natural History have specimens from Bogotá and the former has some from Frontino and Santa Marta as well. In Venezuela this Torrent Duck has, so far as I know, been taken only at or near Merida (von Berlepsch, 1894) and more recently at Laguna de Pan de Azucar and Rio Alba (9000 ft.), both in the northwestern part (Osgood and Conover, 1922). A male in the Museum of Comparative Zoölogy was taken at Rio Mucujun, near Merida.

### GENERAL HABITS

As in the other Torrent Ducks no connected account of the habits of this species has been published. It is not uncommon on the rapid rivers of the subtropical zone in Colombia (F. M. Chapman, 1917) and in Ecuador has been taken at altitudes up to 12,000 feet (C. Chubb, 1919).

The United States National Museum possesses two eggs collected on November 30, 1899, near Cali, Colombia, by Mr. F. C. Holman. They are of a dirty buff color with a dull surface. One measures 62 by 42 mm. and the other 59 by 41 mm. These are, I believe, the only eggs of any Torrent Duck ever found. Mr. Holman appended a note which I summarize as follows: The two eggs and a female were taken east of Cali in the Cauca Valley at a very high altitude. He never saw birds of this species





COLOMBIAN TORRENT DUCK

Immature

Male

Female







on the wing and says they dive when surprised. The nest with the two eggs was about four feet above the stream on a ledge protected from rain by overhanging rocks, and located in a dark canyon overhung by trees. It was about eight inches in diameter but composed of nothing but a fluffy mass of down, completely hiding and burying the two large eggs. He did not see the bird fly off the nest, but there could be no doubt as to the identity as there were no other water birds seen and very few of any kind in the country. With the down in the nest there were yellow feathers from the breast of the female, and the female, which was killed about three-quarters of a mile below in the stream, had the abdomen partly bare as though plucked. There was a fall of about three to four hundred feet in the stream between the nest and the place where the female was taken, and Mr. Holman rightly wondered that she should be so far away, especially as these birds are not much given to flying. The eggs were warm on both occasions when visited, but neither time was the parent bird seen. They were not incubated to any extent, and the female had a string of embryo eggs in the body about the size of no. 6 shot. There were no fish in the stream, but an examination of the stomach showed the bird had been feeding on the shells of some little worm (undoubtedly caddis "worms").

Mr. Holman added that when he took the eggs they had not been incubated to any extent, having merely a small bloody spot in them and they served to make a Thanksgiving omelette for his table.

Dr. Arthur A. Allen writes me that when he was collecting in Colombia, he found, on the Rio Toch  near Salento, a nest which he took to be that of a Torrent Duck. "The nest," he says, "if you can call it such, was at the end of a tunnel in the bank of a river about four feet above the water and extending back into the bank about three feet. The size of the burrow was about four inches in diameter but I did not measure it carefully. It was not perfectly straight, but sloped upward and to one side." Dr. Allen is a careful observer and felt almost certain that this burrow had been occupied by a *Merganetta* for the broken egg-shells which he found "looked like ducks' eggs" and there were also a few reddish breast feathers scattered among the egg remains. During the time that Dr. Allen was in the country inhabited by these birds (September to February) he saw no other evidence of their breeding, nor were the few he saw (not more than a dozen or fifteen) ever in flocks, but rather scattered singly along streams. Always in swift water where the stream rushed over boulders, they reminded him of Grebes in the way they sat low on the water and often sank from sight without apparent effort. They were wild and hard to get and he collected not more than a half-dozen in all.



# PERUVIAN TORRENT DUCK

*MERGANETTA LEUCOGENYS* (Tschudi)

(Plate 94)

## SYNONYMY

*Anas leucogenis* (sic) Tschudi, Arch. f. Naturgesch., vol. 9, pt. 1, p. 390, 1843.

*Erismatura leucogenys* Tschudi, Arch. f. Naturgesch., vol. 10, pt. 1, p. 316, 1844.

*Merganetta leucogenys* Tschudi, Fauna Peruana, Aves, pp. 55, 311, pl. 36, 1846.

*Merganetta armata* G. R. Gray (in part), Genera Birds, Appendix, p. 28, 1849.

*Biziura armata* Schlegel (in part), Mus. des Pays-Bas, Anseres, p. 12, 1866.

*Rhaphipterus leucogenys* Reichenow (in part), Ornith. Centralbl., 1882, p. 3.

## VERNACULAR NAMES

*English:* Peruvian Torrent Duck, Peruvian Spur-winged Duck, Tschudi's Spur-winged Duck, White-cheeked Torrent Duck.

*German:* Tschudis Borstensäger.

## DESCRIPTION

**ADULT MALE:** Most resembles *Merganetta turneri* but the lower side instead of being solid black or nearly so, is streaked with black, while the ground color of the abdomen is light gray with a faint reddish tinge, as in *Merganetta garleppi*. Upper side very nearly as in *Merganetta turneri*, the centers of the feathers of the mantle and scapulars very black, while a distinct black ring separates the white of the neck from the streaked pattern of the breast. The upper mantle is nearly solid black, as in *Merganetta turneri*. Wing with a long, sharp carpal spur and colored the same as in several other species.

Iris brown. Bill, legs and feet, reddish to "Indian red."

Wing 171–178 mm.; tarsus 38–45; culmen 29–31.

**ADULT FEMALE:** Occiput rich slate gray and the sides of face and neck gray, very finely vermiculated with white. Anterior portion of cheeks, chin, throat and whole under surface rich dark cinnamon. Mantle and scapulars black, with edges of feathers light gray. Rump and upper tail-coverts as in male. Tail and wing as in male.

Wing 155–160 mm.; culmen 25–28; tarsus 36–38.

**JUVENAL SPECIMENS** not examined but undoubtedly of the same gray-backed, white-headed type as in other Torrent Ducks.

**YOUNG IN DOWN** (see Plate 94, specimens in American Museum of Natural History): These are pure white below and very dark gray to black above. The white extends up to the occiput except for a narrow, black, postorbital stripe and another black stripe from near the ear to the nape. There is a white bar on each wing and another 20 mm. long in the middle of the back. From back of the wings to the root of the tail on each side is a broad white stripe. The mantle is somewhat grayer than the back.



These young are provided with stiff tail-feathers (barbules) 52 mm. long. These, as noticed in another place, are not shed, but pushed out by the first (juvenal) tail and remain firmly attached to it. There they apparently remain until worn or broken off.

REMARKS: In the American Museum of Natural History, New York, a series of five adult males from Junin, Peru, shows some little variation in the color of the mantle. No. 173965 (Chipa) has almost a black mantle, while No. 169556 from Maraynioc (10,850 feet) is black only on the extreme anterior part of the mantle. Both these specimens are practically from the same locality. A third, No. 173965, is darker than usual on the lower abdomen and under tail-coverts. No. 144969 from Huaracundo Cañon, is darker on the upper breast than the others.

Is the above merely individual variation? If so, it points to the essential sameness of most of the Torrent Ducks which can hardly be more than geographical races.

### DISTRIBUTION

THIS Torrent Duck appears to inhabit only the Andes of north-central Peru and Ecuador. Tschudi (1845-46) recorded it from the source of the Aynamayo and Taczanowski (1886) from Maraynioc, Tambillo and Huambo. Specimens have also been taken in the Valley of the Marcapata, Cuzco Province (von Berlepsch and Stolzmann, 1906). In the Urubamba Valley, F. M. Chapman (1921) found it a common species in the temperate zone and a number of specimens, including downy young, were taken up to 11,000 feet or more. The American Museum of Natural History has other specimens from the Rio Mantaro and Rio Keatin, while Lord William Percy possesses a series collected by himself near Lake Junin in April. There is an old specimen in the Museum of Comparative Zoölogy taken by Garman near Lake Titicaca about 1874. The Field Museum of Natural History (in Chicago) has one from the Panao Mountains in Peru (10,300 feet, J. T. Zimmer, collector) and a female from Molinopampa, Peru (M. P. Anderson, collector).

### GENERAL HABITS

THERE is evidently no difference between this and other Torrent Ducks so far as habits are concerned. The best field-note is given by Whitely (P. L. Sclater and Salvin, 1874) who says of south-central Peru: "This bird is found in almost all the rivers and small mountain streams of the Upper Andes. It is a beautiful sight to come across a pair of them swimming about amongst the immense boulders in one of these mountain-torrents. It dives with great rapidity equally well upstream against a strong current, as downstream. It climbs up large stones that, with the action of the water constantly passing over them, have become smooth as glass, and seems to be greatly aided in this by the stiff feathers in the tail. I think the spikes on the wings are meant to assist the bird in diving rapidly, as I know of no enemy it has that would make them a formidable weapon to be used in attack or defense. Its food consists of grasses and sedges; and the flesh is said to be a great delicacy, though personally I have never made the trial. The males are much more plentiful than the females. I have not been able to find their breeding ground, but should suspect it would be in some of the small caverns near the mountain-torrents."

Stolzmann (in Taczanowski, 1886) writes as follows: "This curious duck lives on



the larger mountain streams, but everywhere it is uncommon. Ordinarily it is seen in pairs. It swims with great rapidity, even against the swiftest current. Usually it fishes in the places where the current forms little boiling and foaming cascades. It dives and swims with incomparable celerity. Sometimes it gets out on the boulders which lie in the stream-bed. In October a pair appeared with three young in down, of which we took one, which died after some days."

The collectors of the American Museum of Natural History found it on streams at altitudes of 9000 to 11,000 feet in central Peru and on July 22 took two young in down at the Huaracundo Cañon, at an altitude of 10,000 feet. The stomachs of specimens collected by Lord William Percy on a torrent stream at Lake Junin (12,000 feet) on April 2, 1920, and analyzed by the U.S. Biological Survey, contained practically nothing except animal matter. The first had 50% of ground-up caddis larvæ and their cases; 45% mayfly nymphs; 5% beetle larva (1). The second contained 90% ground-up caddis cases and larvæ (of the *Helicopsyche* type); 9% mayfly nymphs; and 1% of vegetable matter, consisting of one seed of *Zannichellia palustris* and bits of rootlets. The third stomach contained 40% of caddis larvæ and cases; 60% of mayfly nymphs; and a trace of rootlets. Besides the food there was the usual amount of gravel, etc., always found in duck stomachs. So far as I know this is the only careful study ever made of the food of the Torrent Duck. It reminds one strongly of the sort of material found in the stomach of the Blue Mountain Duck of New Zealand.

The two downy young in the American Museum of Natural History are only a few days old and were taken with both parents at Lucma, Peru, on July 22. They have been figured in Mr. Brooks' plate. It is interesting to notice that the male was with the female and her brood and that there were only two young ones. So far as I know the female only lays two eggs, the smallest clutch of any known duck. The only other duck which approaches this is the Musk Duck of Australia, whose typical clutch is two to three eggs.





PERUVIAN TORRENT DUCK

Female

Male

Downy Young







*SUBFAMILY MERGINÆ*







### SUBFAMILY MERGINÆ

THE Mergansers form a rather compact group of ducks adapted for living on fish, which, like loons and cormorants, they can pursue under water. In structure they are closely like the diving ducks (*Fuligulinæ*) which they resemble in the possession of a large flap-like lobe to the hind toe and in the large *bulla ossea* with membranous windows as well as in the peculiar dilatations of the trachea. In addition, however, they are still further specialized for the pursuit and capture of fish through the greater compression of the tarsi, the increased length of the neck and particularly in the bill which is much narrowed, almost cylindrical, with an overhanging nail and with its lamellæ developed into prominent serrations as an aid in seizing and holding its active prey. Three genera are here recognized, whose chief structural characters are given in the following key (see Coues, 1903).

- A. Tarsus longer than culmen; tail-feathers sixteen .....*Mergellus*
- B. Tarsus shorter than culmen; tail-feathers eighteen.
  - a. Bill less than half total length of head, its serrations low, oblique, not hooked; tarsus about half as long as middle toe; tail more than half as long as wing; crest of male highly developed.....*Lophodytes*
  - b. Bill more than half total length of head, its serrations sharp, recurved; tarsus about two-thirds the length of middle toe; tail about one-half length of wing; crest slightly developed.....*Mergus*







## SMEW

*MERGELLUS ALBELLUS* (LINNÉ)

(Plate 95)

### SYNONYMY

*Mergus albellus* Linné, Systema Naturæ, ed. 10, vol. 1, p. 129, 1758.

*Mergus minutus* Linné, Systema Naturæ, ed. 12, vol. 1, p. 209, 1766.

*Mergus albulus* Scopoli, Ann. I Hist. Nat., p. 71, 1769.

*Mergus pannonicus* Scopoli, Ann. I Hist. Nat., p. 72, 1769.

*Merganser cinereus* Gerini, Storia degli Uccelli, vol. 5, pl. 511, 1776.

*Merganser minor* Gerini, Storia degli Uccelli, vol. 5, pl. 514, 1776.

*Merganser albellus* Boddaert, Tabl. des Planches Enluminées, p. 27, 1783.

?*Mergus furcifer* Beseke, Schrift. der Berlin. Naturforsch. Ges., vol. 7, p. 458, 1787.

*Merganser minutus* Bonnaterre, Encyclop. Méthodique, vol. 1, p. 105, 1790.

?*Merganser furcifer* Bonnaterre, Encyclop. Méthodique, vol. 1, p. 105, 1790.

*Mergus mustelinus* Bechstein, Ornith. Taschenbuch, vol. 2, p. 401, 1803.

*Mergus panocicus* Bechstein, Ornith. Taschenbuch, vol. 2, p. 402, 1803.

*Mergus maculatus* Bechstein, Ornith. Taschenbuch, vol. 2, p. 402, 1803.

*Mergellus albellus* Selby, Cat. Genera and Subgenera Birds, p. 47, 1840.

*Mergellus minutus* Brehm, Naumannia, 1855, p. 299.

*Mergulus* (lapsu) *albellus* Blakiston and Pryer, Trans. Asiatic Soc. Japan, vol. 8, p. 187, 1880.

### VERNACULAR NAMES

*English:* Smew, Smee, White Wigeon, Weasel-head, Weasel Wigeon, Vare, Nun, White Nun.

*German:* Zwergsäger, Kleiner Säger, Weisser Säger, Kleiner Sägetaucher, Meven-taucher, Elstertaucher, Eistaucher, Rheintaucher, Merch, Scheckente, Kreuz-ente, Sternente, Winterente, Wieselentchen, Nonnenentchen, Nonnelli, Pfeilschwanz, Weisskopf.

*French:* Harle huppé, Piette, Harle piette, Harle blanc, Religieuse, Nonnette, Becscie, Petit bièvre, Petit cantin, Petit vierd, Catinette.

*Spanish:* Bech de serra petit.

*Dutch:* Nonnetje, Weeuwte, Scheft, Kleine Zaegbek, Scherpbek, Nonduiker.

*Italian:* Pesciaiola, Smergo, Monaca bianca, Pescarin, Gavar, Pisciatella, Bugagnol, Anzoletto, Seroleta, Svasso, Sugherone, Serretiello, Siretta domenicana, Soccalettu.



*Flemish:* Gegeltje.

*Friesian:* Skoar, Lytse dukelein.

*Danish:* Nonne, Hvidskråkke, Hvid Skallesluger, Hvidside.

*Norwegian:* Lap Fiskand, Hvid Fiskand, Liden Fiskand, Dverg Fiskand.

*Swedish:* Salskrake, Salknipa.

*Finnish:* Uivelo, Ungelo, Haukinielu, Herna.

*Russian:* Krahallutok, Paganka, Utkaribachka, Nyrok, Lytok.

*Polish:* Tracz dniestrovka.

*Czech:* Morčák bílý.

*Croatian:* Ronac bijeli.

*Slovene:* Belič, Mali potapljavec.

*Hungarian:* Kis bukó, Ejszaki sark buvár, Kis muszkabuvár, Kis buvárécze.

*Maltese:* Serra, Baál tal serra.

*Kirgis:* Balykchi-iyriok.

*Tartar:* Magache, Kiriiter-mar-urdak.

*Sindi:* Nihenne.

*Afghanistan:* Ghotye, Chota-khoruk.

*Yarkand:* Boz-aurdak.

*Samoyede:* Chalingchat.

*Tunguse:* Momra.

*Ostiak:* Simsaer, Kychaki, Konnali.

*Kamchatka:* Soalukychi.

*Korean:* Jalalgalgapin.

*Japanese:* Miko-aisa.

## DESCRIPTION

**ADULT MALE:** Head and neck white except for a greenish-black patch on lores and encircling eyes. A patch of the same color on crown extending back on to the long occipital crest. Mantle white except that a narrow black band or bands cross its posterior part and extend down on to the sides of the breast. Another black band runs across the front of the wing and down upon the sides. Remainder of mantle, inner scapulars, and back blackish. Most of scapulars white; rump ashy gray, tail gray. Whole lower surface spotless white except the sides and flanks which are vermiculated with fine wavy black lines. Marginal wing-coverts and greater coverts mostly black, and central ones white; there is a white band at the tip of the greater coverts. Secondaries black to dark brown, broadly tipped with white and the inner ones mostly white on the outer web. Tertiaries silvery gray like the lower rump and tail. Under wing mostly gray except some of the central coverts and the axillars which are white.

Iris bright red. Bill plumbeous, nail grayish white. Legs and feet plumbeous (Witherby *et al.*).

Wing 192–205 mm.; bill 28–30; tarsus 30–34.

Weight about 1½ pounds (0.68 kilograms) (Cordeaux, 1896, p. 202).

**ADULT FEMALE:** Whole top of head down to gape and well below eyes bright cinnamon brown fading into grayish on the nape. Rest of head down to lower neck pure white. Lower neck and mantle gray, darker down the center of the upper side. Scapulars mostly lighter gray but back and rump dark





SMEW  
Male                      Female  
HOODED MERGANSER  
Female                      Male







brown to blackish like the center of mantle. Rump and tail brownish to silvery gray. Lower parts all pure white except the upper breast which is faintly tinged and barred with gray, and the sides and flanks which are light gray. Wing about as in male but white patch not so large and tertials browner and shorter.

Iris dark brown (probably never actually red as stated by Witherby *et al.*, 1919-22). Bill dark lead-color with the nail whitish. Legs and feet grayish or greenish; said to be lighter colored than in the male.

Wing 178-186 mm.; bill 25-29; tarsus 30-34.

**MALE AND FEMALE IN FIRST (JUVENAL) PLUMAGE:** Very much like adult female but distinguished by brownish edges on central wing-coverts which more or less obscure the white wing-patch. Other differences slight but upper side apt to be more brownish and first tail-feathers always blunted at tips. It is said that the white bands formed by the tips of the secondaries and greater coverts are a little wider than they are in the adult female and this seems to be the case with the small series at hand.

**IMMATURE MALE:** At first only to be distinguished from female by larger size and by the lighter color on the innermost secondaries. The eye is *probably* lighter in color by early autumn. The young male goes through his first winter in a plumage essentially like that of the female, just as the young male Hooded Mergansers do. Forward birds begin to acquire some adult feathering during their first summer (ten to twelve months old) and this, according to Witherby *et al.* (1919-22), begins with a few white feathers on the crown, while the lores and a patch below the eye are almost black. The black bands down the sides of the breast and across the wing are indicated by white feathers vermiculated ash-brown and with subterminal blackish bars. The scapulars also show changes.

**MALE IN ECLIPSE:** Very much resembles adult female but distinguished by blacker mantle and larger white area on wing-coverts. The center of the upper mantle is intermixed with blackish feathers and a small patch at the sides of the lower rump is dark ash-brown more or less vermiculated ashy white as in winter. Wing nearly as in winter (Witherby *et al.*, 1919-22). A partial eclipse was described by Bonhote in an aviary bird. Toward the end of August the sides of the head were brighter and redder brown than in the female, shading off into chocolate behind. The black spot in front of the eye still remained, although considerably shrunken in size, as well as the patches on the occiput. The flanks were pure bluish-gray color and on the upper side the mantle remained black but the white scapulars were replaced by new bluish-gray feathers.

**YOUNG IN DOWN:** Not examined. According to Salvadori (1895) the upper parts, including the sides of the head below the eye, but only the back of the neck, are dark brown. Below the eye a very small white spot and white spots on the posterior edge of the wing, the sides of the rump, and on the flanks. The throat and sides of the upper part of the neck conspicuously white; crop region dusky; flanks brown; breast and abdomen white.

## DISTRIBUTION

THE Smew is a palæarctic species the range of which extends from the British Isles to Japan, and in winter south to northern Africa and India.

## BREEDING RANGE

VERY little indeed is known of the nesting grounds of this bird. The eggs were first described by Wolley (1859) from specimens taken in the Muonio district of Lapland. It does not nest in Norway, excepting possibly on the frontier of Lapland about Rensvand and Vaggetem (Schaanning, 1913). In Sweden it is known to have bred once near Stock-

Lapland  
Sweden



holm (Westerlund, 1878) and it certainly must nest regularly on the Lapland border, for in north-western Lappmark it breeds in small numbers about Muonio, Kittalä, Enontekis, Enare, Sodankyla and Kuloajärvi. There are records of its nesting even farther south, near Pudasjärvi and Kiantajärvi (Palmén, 1876; Dresser, 1871-81; Finnilä, 1914; Montell, 1917). In Russia the Smew is said by

**Russia** Westerlund (1878) to nest commonly in the interior of the Kola peninsula. This is probably a bit exaggerated, since no other travelers have reported finding nests there. Pleske (1886), however, has recorded a specimen from Kandalaksk. Farther south a nest has been taken on the northwest end of Lake Onega (Kessler, *vide* Dresser, 1871-81). To the eastward the regular breeding ground extends along the lower Dvina and to Archangel (Buturlin, in Dresser, 1908-09; Seebohm, 1882a) and at least as far as the lower Petchora (Seebohm and Harvie-Brown, 1876). In central Russia the Smew breeds in Novgorod (Bianchi, 1910) and probably in Pskov and Tver (Buturlin, in Dresser, 1908-09). It certainly does so in Perm and in Ufa and along the course of the middle and lower Volga (Buturlin, *loc. cit.*; Pleske, 1878; Russki, 1893), as far as Sarepta (Moeschler, 1853) and Astrakhan (Seebohm, 1882; Jacoblev, in Dresser, 1871-81). The statement of Dombrowski (1904) that the Smew nests in the Dobrudja, requires further confirmation.

In Asia this duck is said to nest all over the Kirgis steppe (Nazarow, 1887; Suschkin, 1914), along the Irtysh River (Poliakov, 1916) and south possibly to Pamir (Severtzoff, 1883) and **Turkestan** to the Shyoh River in Kashmir (A. E. Ward, 1907). To the north the breeding range extends as far as the forest, including Tobolsk and Tomsk (Ushakov, 1913; Buturlin, *vide* Dresser, 1908-09), the lower Jenesei (Popham, 1898; Suschkin, 1913), the middle and lower Lena and the **Siberia** Viljui (Maak, 1859; Bunge, 1883; Buturlin, 1908), the lower Jana (von Bunge and von Toll, 1887) and possibly the eastern part of Transbaikalia (Suschkin, 1913). In the Amur Province, A. T. von Middendorff (1853) found the species nesting at Udskoi-ostrog and on **Saghalin** Shantar Island. He states it was common in the breeding season in the Stanovoi Mountains. A specimen was taken at Chaivo, Saghalin Island, in June (Hesse, 1915) and it is said to nest at Marcova (J. A. Allen, 1905). Barrett-Hamilton (1900) collected a specimen **Bering** at Petropavlovsk (Kamchatka) in August, and others have been taken on Bering **Island** Island in May (Stejneger, 1885; Hartert, 1920a). There is no satisfactory evidence that the species nests as far east as Kamchatka or the Commander Islands.

#### WINTER RANGE

THE Smew has occurred in winter in the Shetlands on one or two occasions (A. H. Evans and Buckley, 1899) and in the British Isles is not uncommon on the east coasts of Great Britain; on **Shetlands** the west coasts it is rare, excepting on a few of the Inner Hebrides; on the south coast **British Isles** of England and near London it occurs regularly, but it is rare in Wales and in Ireland, where it occurs chiefly on the coasts of Leinster and Ulster (Seebohm, 1885; Dresser, 1871-81; Ussher and Warren, 1900; Millais, 1913; Witherby *et al.*, 1919-22; etc.).

On the Continent the species has appeared sporadically on the Norwegian coast in winter, between Trondhjem and Hvaler (Schaanning, 1913), and on the south coasts of Sweden (south of Södermann-**Scandinavia** land) it is rare (Nilsson, 1858; Wallengren, 1854). There is but one record of its appearance in winter in the vicinity of Helsingfors (Palmgren, 1913), though on the east **Baltic Coast** coast of the Baltic about Memel, some numbers appear to winter (Floericke, 1898; Christoleit, 1902). There is one record for November 28, 1900, in the vicinity of Petrograd (Bianchi, 1907) and one, January 3, 1896, for Pskov (Zarudny, 1910). In Germany the species is moderately common on the coasts, not infrequently following the river systems inland and occurring occasionally **Germany** in all parts of the country (Naumann, 1896-1905; etc.). It is only moderately common on the coasts of Denmark (Kjörbölling, 1850) and the same is true of Holland (van **Denmark** Oort, 1922), Belgium (Dubois, 1886) and the northern parts of France (Paris, 1907; **France** Ternier and Masse, 1907). I do not find any records of its occurrence on the south



Atlantic coast of France, on the north coast of Spain or on the coasts of Portugal, but it is said to occur in the Strait of Gibraltar (Irby, *vide* Dresser, 1871-81) as well as in the east part of Spain from Andalusia to Catalonia, and on the Balearics (H. Saunders, 1871; Barcelo, *vide* Reyes y Prosper, 1886; Arévalo y Baca, 1887). It is also known to occur in Provence (l'Hermitte, 1916).

Spain

Portugal

The Smew is occasionally seen in winter on the lakes of Switzerland (Fatio, 1904) and is by no means uncommon in parts of northern and central Italy, though it is rare in southern Italy and in Sicily (Giglioli, 1886, 1889-91; Salvadori, 1886; Arrigoni degli Oddi, 1904). It appears to be very unusual in Corsica (Jourdain, 1912), but is said to be not uncommon in Sardinia (Salvadori, 1865; Brooke, 1873). In northern Africa the species occurs in Algeria (Loche, 1867) and in Tunis (J. I. S. Whitaker, 1905), though in Malta it is exceedingly rare (C. A. Wright, 1864; Despott, 1917).

Switzerland

Italy

Algeria

Tunis

In central Europe this species is found in the cold season in the Tyrol (Althammer, 1857) and Bohemia (Fritsch, 1872), as well as throughout the rest of the territory formerly known as the Austro-Hungarian Monarchy. Prazák (1898) speaks of it as common in eastern Galicia, and the same is true of Hungary (Aquila, *passim*). On the Dalmatian coast it is common (Kolombatović, 1903; Kollibay, 1904). Reiser and von Führer (1896) found it in Montenegro in winter, and both Stresemann (1920) and Gengler (1920) found it quite abundant in Serbia. According to Powys (1860) it is common on the coasts of Epirus, and the same is true of Greece (von der Mühle, 1844; Lindermayer, 1860; Reiser, 1905). In Macedonia the Smew is plentiful in the cold months (Elwes and Buckley, 1870; Stresemann, 1920; Chasen, 1921) and it is known to occur in Thrace (Gengler, 1920) and in Bulgaria (Radakoff, 1879; Alléon, 1886; Reiser, 1894). Danford and Harvie-Brown (1875) state that the species is common in winter in Transylvania. In severe winters, at least, it winters in the southern provinces of Russia and in the Crimea (Czernay, 1852; Radde, 1854; G. C. Taylor, 1872; Brauner, 1894; Valkh, 1911). In the Caucasus it is fairly common in the cold season (Seeböhm, 1883; Radde, 1884; Buturlin, 1906).

Austria

Balkan  
States

Russia

On the west coast of Asia Minor the Smew is a moderately abundant winter bird (Braun, 1908), but it has not, as far as I know, been taken in Cyprus, and was found but once in Palestine by Tristram (1884). There are three records of its occurrence in Egypt (Nicoll, 1919).

Asia Minor

Egypt

In Mesopotamia the Smew seems to be rare (Ticehurst, Buxton and Cheesman, 1922; Meinertzhagen, 1914), but in Persia it winters in all suitable localities, notably in the south Caspian and in the Seistan region (Radde, 1886; Zarudny, 1911). To the north Carruthers (1910) found it common on the lower Zarafshan and in parts of Transcaspia it is equally plentiful (Stolzmann, 1893; Gitnikov, 1910). Severtzoff (1883) states that the species winters all over Turkestan, excepting, of course, the arid southwest, and Schalow (1901) reports large numbers on the Issyk-kul in winter. It appears to be rather rare in Afghanistan (C. Swinhoe, 1882) and in Baluchistan (Meinertzhagen, 1920), but it is found about Yarkand in winter (Scully, 1876) and is common in the Punjab (Baker, 1921). In the rest of India it is an uncommon visitor to the northern parts, in Sind, northern Guzerat, and the Northwestern Provinces and Oudh. To the eastward specimens have been taken in Chota Nagpur and as far south as Cuttack. It straggles to Bengal, Assam and Lakhipur (Blanford, 1898; Baker, 1921).

Mesopo-  
tamia

Persia

Turkestan

India

David and Oustalet (1877) state that the species is very common in central China in winter. E. H. Wilson (1913) saw it at Kiating, western China, and Thayer and Bangs (1912) have recorded it from Hupeh Province in December. In the coastal provinces it has been taken as far south as Foochow (La Touche, 1892; Kellogg, 1919). It is plentiful on the lower Yangtse (R. Swinhoe, 1871; La Touche, 1907), has been taken at Kiau-chow (Kleinschmidt, 1913)

China



and is common about Peking (H. A. Walton, 1903). C. W. Campbell (1892) says the species winters in Korea. It certainly does so in Japan, where, in the cold months it is found from Japan Nagasaki in the south to Yezo in the north (Blakiston and Pryer, 1878; Kuroda, *in litt.*).

#### STRAGGLERS

THE Smew is known to have once straggled to the Azores (Godman, 1866) and there is a specimen in the British Museum, sent from North America (no locality) by the Hudson's Bay Company. Other records are even less reliable. An apparently overlooked occurrence is that given by E. A. Samuels (1870) who said he had seen a specimen that was supposed to have been shot in Massachusetts Bay. In the same place he mentions another less definite occurrence. Wilson's remarks on the occurrence of this species are entirely wrong and Audubon's one specimen from near New Orleans "in the winter of 1819" is not known to be in existence.

#### MIGRATION

VERY few definite dates of arrivals and departures have been tabulated.

#### GENERAL HABITS

THE Smew is both a fresh- and a salt-water duck. In winter it is often found on the coast, preferably in the estuaries of rivers and never in the surf or far off-shore. But it is equally common on inland waters, either on the larger rivers or on good-sized lakes. It shows no liking for small bodies of water, but will, if the larger waters freeze up, take refuge even in the smallest spring. It is an exceedingly hardy bird and will go no farther south than necessary to find open water. The males, at least, winter in the coldest regions.

WARINESS. Few, if any, of the duck tribe are as cautious and alert as this little fisherman. Such is the general testimony of those who have seen it in the field. Naumann, indeed, considered it more shy even than the Golden-eye, which is saying a good deal. Writing of the winter birds off Memel, Lithuania, Christoleit (1902) says that the males are far less approachable than the females. They continually stayed farther out and would not permit approach under any circumstances. This is probably the rule everywhere, for those writers who speak of finding the Smew not especially wary (von der Mühle, 1844; Lilford, 1895) were writing of Greece or other far-southern wintering grounds, where adult males are almost never seen. Extreme wildness is of course a characteristic of the old males in many kinds of ducks.

An exceptional case of tameness is recounted by von Willemoes-Suhm (1865). He speaks of a female which came to the Hamburg Gardens and grew very confiding, approaching within ten feet of the keeper and eating the fish thrown to other birds. But even in this case it was impossible to capture it, although several attempts were made.

DAILY MOVEMENTS. This is a day-feeder and like most ducks of this sort (Golden-eyes, etc.) it probably seeks larger bodies of water at night. However, I have not found much information on its flights.









MAP 113. Distribution  
Breeding range, dotted  
Sporadic record





mew (*Mergellus albellus*)

winter range, broken line  
marked by crosses (X)









MAP 113. Distribution of Smew (*Mergellus albellus*)

Breeding range, dotted line; winter range, broken line  
Sporadic records indicated by crosses (X)







GAIT. Finn (1915), speaking of Smews which he watched in the London Gardens, says that "even on land, in spite of the breadth of its body and shortness of its legs, to say nothing of its very large feet, it moves quite quickly and looks far less ungainly than many ducks one would expect to walk better." Naumann says that on land the body is carried horizontally and the neck S-shaped, the crest being raised when the bird pauses.

SWIMMING AND DIVING. The nimbleness and agility of the Smew in the water has aroused the admiration of every one who has seen it and has made it much sought after for ornamental ponds. Its extreme activity as well as its general appearance have given rise to an oft-repeated comparison with the weasel. Ordinarily, when swimming, it floats rather high in the water, though when "on feed" it swims lower, the tail dragging or sometimes a bit under water (Millais, 1913). When alarmed, however, it sinks the body almost completely, only the line of the back remaining visible (Naumann, 1896-1905).

As a diver the Smew is absolutely unexcelled. Hume and Marshall (1879), whose opinions in such matters are well worth consulting, considered them finer divers than any other species of duck, and thought they could outdo even the grebes and cormorants. They found that the birds never dived *en masse*, but always left some lookouts on the surface. Millais (1913) found that the Smews while feeding rarely came up far from where they went down, and therefore concludes that they dive more vertically than the Mergansers. This is not in agreement with what most observers say. Many enlarge on the agility with which the Smew follows its prey under water and speak of their coming up far scattered. Naumann says they will travel as much as fifty feet under water, and he thought they could stay under for minutes. The latter statement is undoubtedly exaggerated, and Christoleit (1902) is probably nearer right in saying that the dive rarely exceeds fifteen seconds in length.

Whether or not the wings are ever used in diving still remains to be decided. Seebohm (1885) says that Smews use the wings like the Guillemot, but does not say that this is a personal observation. Hume (Hume and Marshall, 1879) saw the wings used, though not fully spread, but this was in the case of a wounded bird and means little. C. W. Townsend (1909) is of the opinion that our American Fish Ducks do not normally use the wings. I am inclined to agree with Naumann (1896-1905) and Millais (1913), who doubt whether the Smew uses its wings under water.

FLIGHT. On the wing the Smew is quite as able as in the water. The flight, as described by Hume and Marshall (1879), is very fast and like that of the Teal, but almost silent and with less wing-rustle than in any other species of duck. Naumann also compares it to the flight of Teal and remarks on its noiselessness. He says the birds swing from side to side a good deal and usually dive immediately on alighting.



Millais (1913) describes the flight as very rapid, the neck being held stiffly and straight and the bird often shooting down close to the surface.

Smews rarely gather into large flocks. The ordinary company numbers anywhere from twelve to twenty, less than seven and more than forty being quite unusual (Hume and Marshall, 1879).

ASSOCIATION WITH OTHER SPECIES. This little Fish Duck has a remarkable preference for the Golden-eye, which it resembles in many of its habits. It is by no means rare to find a male Golden-eye heading a company of Smews. In fact, Naumann says that in Germany it is unusual to see a flock of Smews without one or two Golden-eyes among them. Near Memel, Christoleit (1902) saw them in the company of other Mergansers and of the Long-tailed Duck, and Prjevalski (1878), writing of eastern Asia, says he usually saw them associated with the Common and Baikal Teals.

VOICE. The Smew is an exceedingly silent bird. Naumann described the note as a grating noise (female?) and Hume and Marshall (1879) do the same, adding that it is intermediate between the *caw* of a rook and the *quack* of a duck, not unlike that of a Pochard, but less deep and more sharp. Lilford (1895) says he has never heard anything but a short hissing whistle from the male, and this is probably correct. The grating noise must be attributed to the female. Millais (1913) speaks of a different sound uttered by the male during courtship. He describes it as "a prolonged croak or grunt like the word *err-err-err-umph*, the last sound being an exhalation to clear the lungs, and seeming to be an effort on the part of the bird."

The trachea of the male, as described by Macgillivray (1852) is very peculiar. It is nine inches in length, and the upper two inches and a half are considerably flattened and only about one-half as wide as the rest of the trachea. The tracheal box differs from that of the other Mergansers in being larger transversely than vertically. It is left-sided with two lateral membranes, the posterior one being decidedly the larger. The greatest diameter of the tracheal bulb is one and a third inches, and it is separated by an interior partition into two parts. There is a good drawing of it in Yarrell's *British Birds* (1884-85).

FOOD. The food of the Smew, like that of the true Mergansers, consists primarily of fish, though water insects and occasionally even vegetable matter are taken. Naumann lists the following articles of diet: salt-water minnows (*Atherina hepsetus*) and common shrimps (*Crangon vulgaris*), as well as small frogs and water insects, besides gudgeon, roach, trout fry, small eels and elvers. Hume and Marshall (1879) say they never found any vegetable matter or anything but fish and water insects, chiefly a kind of cricket (?). On the other hand Cordeaux (1896) says that in an old



female he found a mass of vegetable fiber, and he tells of one which contained five small roach, three to five inches in length. Radde (1854) states that in one stomach he found a carp (*Cyprinus*) five inches long, besides two smaller ones, and in the Caucasus he (1884) found that they fed on the larvæ of fresh-water insects (*Notonectes*). According to Yarrell (1884-85) Gurney found a frog in the gullet of a specimen purchased in Leadenhall Market in January. Witherby *et al.* (1919-22) mention fluke, young salmon and eels up to eleven and a half inches, as well as bleak, sand-smelt and sticklebacks; small crustaceans, such as fresh-water shrimps and sand-hoppers, as well as insects and water beetles.

The feeding habits are vividly described by Naumann, who says the birds usually dive together and in that way prevent many of the fish from escaping. He adds that in winter they will dive from the smallest opening in the ice, pursue their prey under the ice, and appear again in the opening. Christoleit (1902) noted that they always devoured the food on the surface. I rather doubt whether this is the case with the smaller objects. All the diving ducks are apt to come to the surface when they are getting particularly large objects, either fish or shells.

**COURTSHIP AND NESTING.** The courtship has been described by Millais (1913) and by Lord William Percy (in Millais), both from observations of a male in the London Gardens while displaying before female Goosanders or Red-breasted Mergansers. The performance is said to be not very showy, but extraordinarily pretty and attractive. First the male swims slowly about the female, sometimes raising the long scapulars somewhat. Often the head and neck are moved forward slowly and when about to display, the neck is drawn far back between the scapulars all the time. The crest is raised in a peculiar way with the forward part, consisting of only a few feathers of the crown, quite separate from the rear part, which lies flat on the nuchal patch. The second attitude consists in slowly pushing the neck forward and back as far as possible, raising the crest and pointing the chin upward, there being a slight rise in the fore part of the body. The mating cry, already described, is then heard. During this posture the bird is stationary, the tail lying upon or under the water. In the third attitude he executes a quick forward dip of the head and bill, following it with a sudden rise of the fore part of the body out of the water, like the Mallard and Teal display, but not so upright. During this the feet are paddled vigorously to maintain equilibrium. The final act consists in the bird dropping to the water with neck outstretched and parallel to the surface, often making a little rush forward.

Percy's independent observations on the same bird are worth quoting: "First attitude: simply the raising of the head and body in the water and the erection of the fore part of the crest. Also a general raising of feathers on head, neck and scapulars. The bird is now swimming. Second attitude: throws the head back, but does not raise the body at all. On the contrary it is sunk, the water running over the tail.



Crest still raised forward. Third attitude: the throw forward and a little rush through the water. As the head comes forward the bird paddles hard without raising the body from the water, but in a forward and not in an upright position. It is as he throws forward one hears the call. Fourth attitude: the head is now brought right down, so that the bill touches the water. At the end of the previous movement the head and neck are stretched out in front, the bill pointing straight." Percy adds that he would be very glad to see the male displaying before its own lady instead of an old Common Merganser duck.

We know less of the breeding habits of the Smew than perhaps of any other European duck. The first authentic nests and eggs were described by John Wolley in a well-remembered article in the *Ibis* (1859), in which he tells of four years of searching in Lapland. But even that famous oölogist never actually saw the nest himself and I do not know of any other writer who has described it from personal observation. From Wolley's article and the information attached to later clutches (A. Newton, 1907) it appears that in Lapland the Smew is a rare breeder, laying its eggs in hollow trees and in the nesting boxes hung up for the Golden-eye. In one case six Smew's eggs and three of the Golden-eye were found in the same *halke*. The laying season seems to be chiefly the middle of June, though, according to Hartert (1920a) clutches have been taken in northern Europe as early as late May and as late as July. On Shantar Island, off the mouth of the Amur River, A. T. von Middendorff (1853) found young as early as July 3, but in another year not until August 22. Pallas (1831) long ago described the nest as being always placed in hollow trees, and the statement is repeated by Seebohm (1882, 1882a) writing of Archangel and Astrakhan. I doubt very much whether the nest is ever on the ground, as stated by Temminck.

The clutch varies in number from six to ten, the usual number being eight or nine. The eggs closely resemble those of the Widgeon, being of a creamy yellow. As a rule they are somewhat smaller than the Widgeon's. The length in 107 eggs varied from 47.7 to 58 mm., the breadth 34 to 40.5 mm. The average measurements were 52.42 by 37.46 mm. (Hartert, 1920a). The nest-down is small and grayish white (Millais, 1913).

The incubation period is unknown and we have no information whatsoever regarding the care of the young, the movements of the male during and after incubation and the moulting of the female.

STATUS. In western Europe the Smew is nowhere a common bird and certainly cannot be compared with the Mergansers in point of numbers. But it is still seen in small flocks quite regularly near London. Specific information regarding the comparative abundance is, however, lacking. On the Petchora, Seebohm (1885) found it in summer not quite so common as Teal, Widgeon or Pintail. The center of abundance in winter is in the Adriatic and the eastern Mediterranean. On the Monte-



negrin coast (Bocche di Cattaro) it is said to be more numerous than the Red-breasted Merganser (Kollibay, 1904; Reiser and von Führer, 1896) and in Greece it outnumbers the other Mergansers and almost equals the Golden-eye in abundance (von der Mühle, 1844). In India it is only moderately common (Hume and Marshall, 1879; Baker, 1921).

**DAMAGE.** The feeding habits of the Smew make it a menace to young trout, eels and other edible fish, but, as Naumann rightly remarks, the bird is nowhere common enough in Europe to cause destruction on a large scale. From the economic point of view it is far less dangerous than the other Mergansers.

**FOOD VALUE.** Feeding, as it does, almost entirely on fish, the Smew is generally regarded as out of the question as an article of food. Pallas dismisses it with the brief characterization "pisculentissima." Finn (1915), however, asserts that one he shot was "quite good eating" and contrary to his expectations. Possibly the young birds in autumn, fresh from interior breeding grounds, may be edible, just as our young Hooded Mergansers are. Even young Scoters under similar circumstances are sometimes "inoffensive."

**HUNT.** Speaking of the difficulties of bagging the Smew, Hume and Marshall (1879) say: "As a rule, they are wary birds, and difficult to approach. They keep in deep water, far away from any cover, and you can only shoot them from a boat. They can swim faster than any ordinary up-country native boat can be propelled, and faster than one can paddle a punt when lying down. They keep a very sharp look-out, never diving *en masse*, but some always watching, whilst the rest are under water, and, as a rule, the moment they see *any* boat they swim away. In the grey of the morning, when a light stratum of mist lies along the surface of the water, you may creep up in a punt within shot, unnoticed; but then one is very apt, peering through the mist in the twilight, to misjudge distances, and generally make a mess of the matter. Once knowing of a large party of Smews, I went after them early, and as I thought found and fired at them, to find directly I stood up, that I had killed half a boat-load of stilts, small paddy birds, and all kinds of useless waders, standing up to their bellies in the water on a hidden shoal, which, as they loomed through the mist, I could have sworn were the Smews. If you wait, as one does with most other fowl, till you can make certain what they are, they see you, and away they go swimming with little but their heads and necks visible, faster than you can paddle. But at times, I presume when they have never previously been fired at, you can get within shot without difficulty in a punt, and even by a little management in a common native boat, and you can always get a shot by sailing past them at about forty yards distance.

"They swim and dive splendidly, and if only a single boat is after them, they will constantly stick to the water even after being fired at, rising perhaps at the moment,



but dropping within fifty yards, and instantly diving to reappear from fifty to a hundred yards beyond the place at which they vanished. They come up scattered, but all swim converging on one point, and in a few minutes are swimming away in a close lump, just as before you fired. But if two or three boats hem them in, they generally rise, and, if the place is small, disappear — if large, circle round and light again a couple of miles off.”

**BEHAVIOR IN CAPTIVITY.** Attempts to keep the Smew in confinement go back at least to about 1840, when, according to Yarrell (1884–85), one lived for over two years on the pond in St. James Park. The London Gardens received Smews in 1851 and they have been kept at intervals ever since, though they rarely lived more than a few years. The longevity of nine specimens averaged only one year and ten months, the longest being three years and eight months (P. C. Mitchell, 1911). It has also been kept on the Continent and I remember in 1922 seeing them in the gardens of Rotterdam and Amsterdam, where, I was told, they did well and lived many years. All that I saw there, however, were females or young birds.

Lord Lilford (1895), who occasionally kept Smews, says they become very tame in confinement and eat fish, raw meat and even vegetable food. These observations are borne out by Bonhote (1905), who succeeded in keeping one for six months. “At first he was very shy,” Bonhote writes, “remaining bunched up in the cover all day; but eventually he became quite tame, coming up to be fed and taking the fish from our hands. His nature was very sluggish, and he spent much of his time on land, entering the water chiefly for the purpose of bathing. Although having full use of his wings, I never saw him fly or even attempt to rise from the ground, where, however, he could walk fairly well, and better than the true diving ducks.”

Mr. Wormald has given a good account of the behavior in confinement (London Field, vol. 131, p. 3, 1918, and in Millais, 1913). He found them decidedly short-lived and unsatisfactory, though interesting and charming. Two-thirds of their diet was fish and the other third pieces of liver and rabbit’s flesh. They were greedy feeders, but soon preferred the animal food to fish and even developed a taste for barley meal. They became so fond of the artificial food that they never made any attempt to catch the small fish in the pond. Though pinioned they were very quick and energetic, walking, running and even perching with ease. Mr. Wormald noted that they would swim rapidly along the surface with head just submerged, while the neck moved quickly with a snake-like motion until a fish was seen, when the bird instantly submerged. Small fish were swallowed under water, but the larger ones were brought to the surface.

**HYBRIDS.** Crosses between the Smew and the Golden-eye have several times been recorded (Poll, 1911) and are not to be wondered at considering the close association of the two species. I know of no other hybrids.



## HOODED MERGANSER

*LOPHODYTES CUCULLATUS* (LINNÉ)

(Plates 95, 96)

### SYNONYMY

*Mergus cucullatus* Linné, Systema Naturæ, ed. 10, vol. 1, p. 129, 1758.

?*Mergus fuscus* Latham, Index Ornith., vol. 2, p. 832, 1790 (*ex* Pennant).

*Merganser cucullatus* Bonnaterre, Encyclop. Méthodique, vol. 1, p. 103, pl. 27, fig. 2, 1790.

*Merganser fuscus* Stephens, General Zool., vol. 12, pt. 2, p. 170, 1824.

*Lophodytes cucullatus* Reichenbach, Avium Syst., Natatores, p. ix, 1852.

### VERNACULAR NAMES

*English:* Hooded Merganser, Hooded Sheldrake, Little Sawbill, Pheasant Duck, Water Pheasant, Swamp Sheldrake, Oyster Duck, Frog Duck, Fish Duck, Hairy-crowned Teal, Hairy-crown, Round-crested Duck, Fan-crest, Pickaxe Sheldrake, Pied Sheldrake, Pond Sheldrake, Wood Sheldrake, Saw-bill Diver, Spike-bill, Cock Robin Duck, Snowl, Moss-head, Tow-head, Tadpole, Tree Duck, Iron-head, Bastard Teal, Summer Duck.

*German:* Schofsäger, Haubensäger.

*French:* Harle couronné, Harle piette, Petit harle, Harle huppé, Bec-scie de cy-prière (Louisiana).

*Spanish:* Pato de copete.

*Mexican:* Desconocido: means unknown!

### DESCRIPTION

**ADULT MALE:** Head and neck black except for a large white wedge-shaped patch extending back on to the feathers of the long crest. This patch is bordered with black along the outer rim of the crest. Mantle black, this color extending down on to the sides of the breast as crescentic bars and at times as an irregular black line across the breast. Scapulars black; back, rump, upper tail-coverts and tail dark brownish black. Breast and abdomen white, the white extending up on to the mantle and scapulars in two clean-cut crescent-shaped bands. Sides and flanks sandy brown to chestnut-color narrowly banded with wavy black lines. Under tail-coverts sprinkled with grayish brown, central wing-coverts gray, the rest black except that the greater row have a white band at their tips. Secondaries brown except the inner ones which have broad white bands on their outer webs. Tertiaries long, pointed, and of the ornamental type, purplish black with white shaft-stripes. Under wing brownish with the axillars and under wing-coverts white.

Iris bright yellow to golden yellow. Bill black. Legs and feet dull yellowish olive to light brown, the posterior edge of tarsus and the webs black (specimens at Wenham Lake, November).

Wing 190–202 mm.; tarsus 31–35; culmen 36–41.

Weight 1 pound, 8 ounces to 1 pound, 10 ounces (0.68 to 0.75 kilograms) (possibly more).



ADULT FEMALE: Whole head and neck except for a whitish patch on chin and throat grayish brown, more rusty colored on the crest. Mantle, scapulars, back, rump, upper tail-coverts and tail black or dark brown. Upper breast gray irregularly barred with white, sharply contrasted with the remainder of the lower parts. Wing brown except for a speculum formed by the white outer edges of the secondaries and the tips of the greater coverts. Tertiaries long and pointed, as in the male, but without white shaft-stripes.

Wing 185–190 mm.; tarsus 32; culmen 36.

Iris hazel-color. Culmen dark, dull green to black with the lower mandible orange. Legs and feet greenish to brownish with the webs black.

YOUNG IN FIRST (JUVENAL) PLUMAGE: Most like adult female but a good deal browner all over, especially on face, neck, upper breast, sides and flanks. Head-crest very slightly developed. Speculum with the white bar along tip of greater secondaries often poorly developed or nearly absent. Tail-feathers blunt at the tips. Sexes alike in this plumage as nearly as can be determined. Possibly there may be a difference in eye color at an early age.

IMMATURE MALE: A plumage very close indeed to that of adult female may be carried all winter, at least up to the end of February and perhaps longer. The first indication of adult plumage may be seen before this but is usually very slight, such as brownish mottling on chin and throat, a few blackish (or black with white spot) feathers on sides of mantle or breast and slightly vermiculated feathers on the flanks. This female type of plumage is apparently carried into the spring as it sometimes is in the Golden-eye. Just what the young male looks like from March to July I am unable to say. More material is needed. It seems certain, however, that nothing resembling adult plumage is attained until November or December of the second year.

MALE IN ECLIPSE: Not examined.

YOUNG IN DOWN (see Plate 96): Except for the shorter bill and smaller size these young look very much like the downies of the Goosander and Red-breasted Merganser. They differ in having a light gray band across the upper breast separating the white of the abdomen from that of the throat. There is little if any bright rusty color on the sides of the face and neck, a feature which is prominent in the young of the larger Mergansers. The dark brown of the top of the head merges rather gradually into the white of the throat. The remainder of the upper side is colored like the top of the head and there are somewhat irregular, not always conspicuous white patches on sides of back, wing-rudiments, and sides of rump.

Iris gray-brown. Upper mandible dusky, lower ochraceous. Feet dusky olive.

## DISTRIBUTION

### BREEDING RANGE

THE regular breeding range of the Hooded Merganser extends over the northern half of the United States and the southern part of Canada. Preble (1908) noted the species as far north as Fort Wrigley on the MacKenzie on October 9. This is the northernmost record. MacKenzie  
Saskatche-  
wan Farther south the species was seen by Lockhart near Fort Resolution in September (fide Baird, Brewer and Ridgway, 1884). Mr. Francis Harper (MS.) says it was not uncommon in the second half of September on the lower reaches of the Athabasca River and on the delta. To the eastward specimens have been taken on Lac du Brochet on May 18 (fide Preble, 1908).

In British Columbia the Hooded Merganser nests rarely in the Cariboo Mountains (A. Brooks, 1903) and has once done so at Errington, Vancouver (U.S. Biological Survey). Allan  
British  
Columbia Brooks saw an adult male at Atlin near the Yukon boundary on June 17, 1924. There are breeding records for Jasper House, Banff and Spotted Lake in western Alberta





DOWNY YOUNG

(Middle) RED-BREASTED MERGANSER

(Upper) HOODED MERGANSER

(Lower) GOOSANDER







(*fide* Preble, 1908; J. and J. M. Macoun, 1909), and Mr. William Rowan writes me that some evidently nest near Edmonton. In southern Saskatchewan nests have been taken at Maple Creek (Bishop, *fide* J. and J. M. Macoun, 1909), Quill Lake (Ferry, 1910), Prince Albert (U.S. Biological Survey) and Cumberland House (R. MacFarlane, 1908). The species is a regular and not uncommon nester in several parts of Manitoba (E. E. Thompson, 1891; J. and J. M. Macoun, 1909; Taverner, 1919), and to the northward is not infrequently seen in the breeding season in the wooded regions along the Nelson River to Hudson Bay and north to Fort Churchill (A. Murray, 1859; Bell, 1880; Preble, 1902). Spreadborough (in J. and J. M. Macoun, 1909) reported the species breeding all the way from the Missinabi River to Cape Henrietta Maria. In southern Ontario it is said to nest about Bracebridge (Spreadborough, in J. and J. M. Macoun, 1909) and probably in the vicinity of Parry Sound (Fleming, 1901). C. W. G. Eifrig (1910) says it is common in summer about Ottawa.

Alberta

Manitoba

Keewatin

Ontario

In the United States this species nests locally (or better, used to) in Maine, New Hampshire and Vermont (G. M. Allen, 1909; etc.). It also breeds in various parts of northern New York (Eaton, 1910), (but rarely at present) and may nest in central Pennsylvania, where, in the past, it is known to have done so at Dubois, Williamsport and in other places (B. H. Warren, 1890; Harlow, 1918). So far as I know it has not been recorded breeding in Ohio since Audubon's time, but there is no reason why a few should not be found nesting there, for it breeds in Indiana (A. W. Butler, 1898), in both parts of Michigan (Barrows, 1912; Wood, 1918; Boies, U.S. Biological Survey), in Wisconsin (Kumlien and Hollister, 1903) and in Illinois (Ridgway, 1895; Woodruff, 1907; Cobleigh, U.S. Biological Survey). There are also breeding records for Louisville and Hickman on the northern and western boundaries of Kentucky (U.S. Biological Survey; Pindar, 1889).

Eastern

United

States

West of the Mississippi the Hooded Merganser is moderately common in summer and nests in Missouri (Widmann, 1907; Rinker, 1899) and in Iowa (R. M. Anderson, 1907; also immature specimen from Chariton in Museum of Comparative Zoölogy). It is a regular breeding bird in Minnesota (Hatch, 1892; Roberts, 1919), but nests rarely in North Dakota (Job, 1899; Bent, 1901-02; Wood, 1923) and South Dakota (Agersborg, 1885). Small numbers breed in Nebraska (W. E. Taylor and Van Vleet, 1888; Oberholser, 1920; Bailey, U.S. Biological Survey) and in Kansas (Bunker, 1913; H. Harris, 1919), as well as in Colorado (W. L. Sclater, 1912), Wyoming (Grave and Walker, 1913; U.S. Biological Survey) and Montana (A. A. Saunders, 1921; Bent, 1923). It is a regular breeder in Washington (Bowles, 1906; Edson, 1908; W. L. Dawson and Bowles, 1909) and Oregon (U.S. Biological Survey). It has not yet been recorded breeding in California.

Central and

Western

States

There are a number of localities in the southeastern States where this Merganser breeds regularly though rarely. It is known to have done so at Big Lake, Arkansas (A. H. Howell, 1911), in Louisiana (Kopman, 1921), at Waverly and Rodney, Mississippi (U.S. Biological Survey), at Montgomery, Alabama (Golsan and Holt, 1914; U.S. Biological Survey), on the lower Santee River in South Carolina (Wayne, 1910), in Buncombe County, North Carolina (specimen in Museum of Comparative Zoölogy), at Darien, Georgia (U.S. Biological Survey) and perhaps in the Knee-knocker Swamps in Brantley County (Harper, MS.); also at Blue Springs and at Palatka, Florida (Brewster, 1878; Scott, 1888, 1892; U.S. Biological Survey). There is little doubt that this southeastern breeding area was once connected with the northeastern center but I have no information that any nests have ever been found along the east-coast States from Massachusetts to North Carolina. But they may yet be found breeding in some of the wild coast districts.

Gulf and

South-

eastern

States

## WINTER RANGE

On the Atlantic coast this Merganser winters very rarely as far north as Massachusetts (Kittredge *et al.*, 1917), Rhode Island and Connecticut (G. M. Allen, 1909), and its very late migration often gives the impression of actual wintering. As a rule it is rare after mid-

Atlantic

Coast



December. It is also rare in New York (Eaton, 1910), in New Jersey (W. Stone, 1909) and in Delaware (Pennock, 1908.) In Maryland it is moderately common (Kirkwood, 1895) and the same is true of Virginia (Rives, 1890). It is abundant in North and South Carolina (T. G. Pearson, C. S. and

**Cuba** H. H. Brimley, 1919; Wayne, 1910) and in Georgia, the range extending to central Florida (Scott, 1888; Cory, 1896; R. W. Williams, 1904) and even to Cuba, where specimens are occasionally found in the markets of Havana and Matanzas (Barbour, 1923).

On the Gulf coast the Hooded Merganser is found in winter in Alabama (Golsan and Holt, 1914) and Louisiana (Kopman, 1921). Some pass the cold season in the Mississippi Valley, uncommonly in Arkansas (A. H. Howell, 1911), Missouri (Widmann, 1907), Illinois (Woodruff, 1907) and Minnesota (Hatch, 1892). About the Great Lakes it is far more abundant, particularly on the shores of Lake Michigan, in Wisconsin (Kumlien and Hollister, 1903), Indiana (A. W. Butler, 1898) and Michigan (Barrows, 1912).

In the South this Merganser is not uncommon along the Gulf coast of Texas as far as the Mexican border (Dresser, 1866; J. C. Merrill, 1878; Beckham, 1888; Strecker, 1912) and it has occasionally been found in Mexico, at Matamoros (Berlandier, *vide* Baird, Brewer and Ridgway, 1884), in the vicinity of Vera Cruz (P. L. Sclater, 1859a; Sumichrast, 1881) and in the Valle de Mexico (Sanchez, 1877-78; Herrera, 1888; Villada, 1891-92). There is also one record of its occurrence in Lower California, at San José del Cabo (Brewster, 1902), but it is very rare south of and in San Diego County (Huey, 1924).

In the interior of our West it probably winters in small numbers in New Mexico, as it does in Arizona (Swarth, 1914), Colorado (W. L. Sclater, 1912), Nebraska (W. E. Taylor and Van Vleet, 1888), and Utah (*vide* Cooke, 1906). It is found on the Pacific coast throughout California, but is nowhere common (J. Grinnell, Bryant and Storer, 1918). The same is true of Oregon (Pope, 1895-96; Woodcock, 1902) and Idaho (J. C. Merrill, 1897). Small numbers winter as far north as Puget Sound (Rathbun, 1915) and even in southern Pacific Coast Vancouver and southern British Columbia (Taverner, 1917; A. Brooks, 1917, *et in litt.*). In southeastern Alaska the species occurs in small numbers in autumn, and it has been taken about Wrangel in November and January (Willett, 1921; A. M. Bailey, MS.). The northernmost record is a questionable one, for St. Michael's, where Bannister (in Dall and Bannister, 1869) believes he saw a large flock in October, 1865.

#### STRAGGLERS

THIS Merganser has straggled twice to the Bermudas — January 10, 1849; December 23, 1850 (S. G. Reid, 1884) — and several times to the British Isles, as follows: North Wales, 1830-31; pair, Queens-town Harbor, December, 1878; Shannon estuary, Kerry, January, 1881. There are other insufficiently authenticated records for Dingle Bay and Tralee Harbor (Kerry); Knockdrin (Meath); Sligo and Norfolk (winter 1837-38); Gloucester (March, 1909); and two in Merionethshire, 1864 (Witherby *et al.*, 1919-22).

#### MIGRATION

As to the time of arrival and departure, numerous dates (always highly uninteresting and not very instructive) might be given. They show that this species is a late-autumn and a very early-spring traveler. I have always looked for them at Wenham Lake, Massachusetts, at about the same time as the Buffle-head Duck. My earliest date for that region in twenty-three years is September 28, 1905, and the average date of first appearance is October 18. The species is exceedingly rare before mid-October and my latest date is December 2, 1922. Mr. Brewster once took a young bird (capable of flight) in the Cambridge region on August 11 (1868), which may have possibly straggled from some near-by nesting ground. The average date of arrival at Alexandria, Virginia (Cooke, 1906), was





MAP 114. Distribution of Hooded Merganser (*Lophodytes cucullatus*)

Breeding range, dotted line; winter range, broken line

Sporadic records indicated by crosses (X)







October 26 and by November 22 the bird became common there. The average date when the last left Montreal was October 29; southern Minnesota, November 10; and central Iowa, November 22.

The earliest autumn arrival near Washington, D.C., was September 17, 1895, and the average first arrival October 26 (M. T. Cooke, 1921).

It is interesting to notice that Brewster (1924) found at Lake Umbagog, Maine, that the local breeding birds left there the last of September and yet we know that migrants do not appear in southern New England before late in October as a rule! He rightly wondered what became of them. Nobody has yet, I believe, marked any of these Mergansers, so we have no records of the actual performance of the individual.

In spring, some movement has been recorded by late February and some average dates of arrival are: western New York, March; Montreal, early April; Ottawa, Ontario, April 18 (earliest, March 21, 1903); southern Michigan, March 19; central Iowa, March 22 (earliest, March 5, 1895), Heron Lake, April 5 (earliest March 20, 1889). This is a very rare spring bird of passage in New England and now that breeding birds are probably gone (or nearly so) it may be said to be almost non-existent. It therefore seems certain that there is in this species, as in a good many of the ducks, a somewhat more western spring migration, sufficient at least to leave out all of New England. Mr. Brewster apparently never saw it at Cambridge, Massachusetts, on spring passage and I think I have only seen it once, March 18, 1904, at Beaver Pond, Beverly. Dr. C. W. Townsend records only one other Essex County record for spring.

In regard to sex dispersal there are evidently interesting facts which we do not yet know much about. My own records show what a very rare bird the old male is on passage in eastern Massachusetts. I do not think I have ever seen more than four or five at Wenham and Mr. Brewster never saw any in the Cambridge region. He did, however, see some at Lake Umbagog. The old males therefore migrate over a somewhat more western line than the young of the year or else they simply do not stop so often on passage. Perhaps the young flocks "fan" out in their first autumn flight over a wider and more eastern route, while the old birds stick to a more direct and conservative route by the way of the Great Lakes to the middle and south Atlantic coast. Similar conditions obtain in other species.

We can only surmise that the males stay somewhat farther north during the cold season than do the females and immatures. On the Potomac River in February, Mr. Harper tells me that males preponderate, this being about the northern wintering limit for any great numbers. With the American Merganser, however, the converse is true, for this species has a northerly winter range and not many old males get as far south as Washington, D.C.

### GENERAL HABITS

PROBABLY this little Merganser deserves the distinction of having a particular genus (*Lophodytes*) devoted to it. It certainly is a well-marked isolated species, differing in almost all its habits from the true wide-ranging Mergansers of holarctic waters. Its food, as evidenced by its bill, is of a rather delicate nature, its courtship and voice are peculiar and its range is more southern than that of most of the common ducks, or either of the large Mergansers. Whether or not it shows any real anatomical affinity to the Smew I do not know, but I rather doubt whether it does.

The Hairy-crown, for such is the usual name given to the bird in most of our middle Atlantic States, is a strictly fresh-water bird behaving in this respect quite differently from the Smew of Europe. It probably, at one time, bred over a good part of its whole range and was no doubt more or less local in many places, just like the Carolina Duck.



It is rather strange that a bird with such a very southern distribution should migrate so late in autumn and so early in spring and should, besides, breed very early in the spring. It loves small, wood-enclosed waters, overflowed woods, mill-ponds and slow streams, but it also winters in the creeks and ponds of large marshes. I do not think it is especially fond of clear, rapid streams, except when other places are frozen over.

Taking it "by and large," it would be a good thing if we could put additional protection on this bird. There are at least three things which count against it as a successful species. First, its southern breeding range, now almost wholly occupied and cut over (lumbered); next, its dependence upon nest-hole cavities; and third, its conspicuous appearance on enclosed, easily accessible waters. All these things have contributed to a reduction in both breeders and migrant birds all over the East, and to a lesser extent in other parts of the United States. However, it is extremely difficult to see how any prohibiting law would do much good in the present unsatisfactory state of enforcement measures. The shooter of the present day comes more and more from cities and, in spite of the abundance and cheapness of popular bird-books, he is less and less able to distinguish game birds in the field. He has not the trained eye of the outdoor man, be he farmer, fisher or sportsman, and any bird that flies over a marsh or sits on the water is a duck! Yes, even the stoutest-smelling of Mergansers has passed for a Canvas-back before now!

WARINESS. Although often credited with a great deal of ability in looking out for itself this is not an intelligent bird. I should certainly rank it among the more unsuccessful species (as far as man is concerned). I have had a great deal of experience with them in autumn in New England, when the little migrating flocks pass through from late October to early December. These are nearly always young birds of the year, with probably a few old females, but I should say less than 1% of old males. At that season the old males are in full plumage and very conspicuous, but they are just as rare with us as are male Buffle-heads. These little flocks are not only tame but will usually come close up to shore to look at a flock of live decoy-ducks. If left alone nearly every flock will eventually give the "stand-gunner" a shot (if he cares to take it). Even old male Hairy-crowns will swim up to live decoys, but in a far more wary manner. In the Carolinas, where the large ducking grounds are located, they are little shot. In spite of not being at all sociable they continually pass back and forth over one's wooden stool-ducks. They pay no heed to the shooter, and seldom learn much about the nature of a "blind." I remember a single male which wintered in one of our Park ponds near Boston, and grew so very tame that any one could walk to within twenty or thirty feet of him.

When they come into our large lakes on migration they very soon seek a cove or a spot near shore to feed in and so are easily stalked and shot.



**DAILY MOVEMENTS.** A very active feeder by day, this bird remains in much the same sort of country at night, and in its winter quarters I do not think it makes long morning and evening flights. It is constantly buzzing about up and down creeks and across marshes all day long and never seems to take a mid-day period of rest. Shooting seldom drives them out of their regular feeding grounds and when disturbed they come back again and again.

**GAIT, SWIMMING AND DIVING.** These birds are fairly easily identified in the field although at long distances the females and young are sometimes mistaken for some of the smaller ducks. A flock of young birds swims rather closely together and the crests are not easily seen, being held low except during active display. The tails are also carried low or dragging in the water. When alarmed the body is sunk low as in other Mergansers and many diving ducks, and they are then prepared for a quick dive. I have no notes on the length of the diving period and can only quote from memory. I should say that most dives must be very short, for they feed a great deal in shallow water. I dare say a good deal of food in summer is caught without diving at all.

Although wounded birds use their wings under water, like almost all water birds, there is no evidence that they employ them at all in the ordinary feeding dive. Nevertheless such habits have been attributed to Hairy-crowns as well as to other Mergansers.

**FLIGHT.** This Merganser gives the impression of tremendous speed on the wing. Perhaps this is partly because it is continuously passing to and fro over the shooter's stool-ducks, or even close to his head. It comes from behind or from either side and dives by with a startling rush of wings, scarcely ever pausing to take account of stock. The flight is direct, the head held low, and the wings move at a remarkable velocity. The bird actually shoots by with the speed and appearance of the proverbial arrow, and, as Elliot has remarked, it is apt to startle the sleepy sportsman from his noon-tide doze.

Flocks are small, so far as I have seen them in any part of the country, and are seldom composed of more than ten or a dozen. Single birds and pairs are common, both on migration and in the winter quarters.

**ASSOCIATION WITH OTHER SPECIES.** It is safe to call this an unsociable bird. I do not remember that I ever saw it mixed in with flocks of the large Mergansers, nor does it seek the same sort of feeding grounds that they do. Occasionally in autumn migration I have seen single ones join a little flock of Buffle-heads but probably merely as a temporary convenience. On its wintering grounds it is certainly one of the most independent of all water-fowl, and although it constantly flies over one's decoys it almost never shows any inclination to stop among them.



On its breeding grounds, however, it comes into contact with other hole-nesting ducks, as well as other birds such as woodpeckers and owls. In eastern regions the Common Golden-eye and the Carolina Duck may compete with it for suitable cavities, while in the far West the Buffle-head or Barrow's Golden-eye search for similar places.

In Maine, Mr. Brewster (MS.) found them actually laying at times in Golden-eyes' nests and one nest which he examined contained eggs of the Golden-eye, Hooded Merganser and Barred Owl. In Iowa, Peck (1896) found a nest which contained thirty eggs of the Carolina Duck and five of the present species, in layers piled one on top of the other.

In the Glacier Park region of Montana a competition for nest cavities was noticed by E. S. Bryant (in F. M. Bailey, 1918) and it seems that actual contests may take place. The oft-quoted story told by Boardman (1903) about a female Hooded Merganser and Carolina Duck which "had been observed for several days contesting for the nest, neither permitting the other to remain in peaceful occupancy," may be mentioned here. This nest was found to contain eighteen fresh eggs of which a third belonged to the Merganser. It would be interesting if we knew more about the outcome of these rivalries. I think it is doubtful whether this species, which seems to have so little of an aggressive nature about it, would be apt to hold its own with Golden-eyes for instance.

VOICE. This is a silent species, more so even than the larger Mergansers. In autumn one may wait a long time before hearing a sound from the flocks of females and young which migrate through New England. Neither do they, as a rule, make any sound except an occasional cluck or croak (the female's note) on the wintering grounds.

The male's note has seldom been properly described. As far as I can make out it must be given only during display, in late winter or spring, and very rarely in autumn. Mr. Brewster heard one at Umbagog give an explosive *kok*, followed by a prolonged rolling *o-o-o-o-o-oc* or *kr-r-r-r-r-r*, hard and woody and something like the snoring sound of leopard frogs. The crest was elevated and the bird probably in display, although the date was October 25.

Mr. Francis Harper kindly wrote me out his observations on courting Hairy-crowns along the Potomac River near Washington on February 8, 1920: "Soon after I reached the river, and before I noticed the display among the Hooded Mergansers, I began to hear a curious note that at first put me in mind of a pickerel frog (*Rana palustris*). However, with several inches of snow on the ground and a temperature scarcely above the freezing-point, certainly no such animal was abroad. The note was really a very guttural purring, rather more than the snore of *Rana palustris* or the hoarse croak of a *Mergus*. It had a very peculiar character that I am somewhat



at a loss to account for; I think, however, it may have been due to the apparent absence of any *distinct beginning* of the sound, at least at the distance at which I heard it. It simply grew upon one, so to speak, almost imperceptibly, sounded for a second or two, and ceased. It undoubtedly came from some of the various species of ducks on the river, and in all likelihood from the Hooded Mergansers. Though I could not absolutely ascribe it to them, it was heard while their display was going on. Moreover, after a trio had flown downstream, I would hear the note in that direction, and after they had returned upstream, I would hear it in the other direction. The sound is far-reaching in still air, apparently being audible at a distance of about half a mile. I suspect the note is uttered at the time the male throws his head back on his rump, with bill in air.

“The frog-like character of the note put me in mind of the vernacular name of this species in the Okefinokee — ‘Frog Duck’ — and upon looking up my notes from the swamp, I find I have quoted one of the inhabitants to the effect that ‘one reason for the name is because it hollers sort o’ like a frog.’”

The female’s voice is not at all peculiar and sounds a good deal like that of other diving ducks and sea ducks. In autumn low croaking or *churr*-ing notes are heard and in the nesting season when flying about among nesting sites a *ca-ca-ca-ca*, somewhat like a female Golden-eye when engaged in the same pursuits but softer and less loud (Brewster, 1924). These circling flights and peculiar cries seem to be indulged in during the incubation season in June.

The trachea of the male (Wenham, December 2, 1922) is 175 mm. long, somewhat flattened and with a slight enlargement in the course of its lower third. Just above the tracheal box there is a sharp bony ridge along the ventral or lower side where the rings are not round, but angular in form. The box itself is peculiar, very solid, heart-shaped and left-sided, and measures about 22.5 mm. long by 10 mm. broad.

**Food.** These rather delicately formed little Fish Ducks select food that is less coarse than that taken by their more powerful cousins, the Goosander and the Red-breasted Merganser. It is certain that they take at times a small share of vegetable matter and they have even been found to eat corn thrown out to attract shoal-water ducks in the Currituck marshes of North Carolina. Fish is not nearly so important a part of the diet as it is with the large Mergansers, and I doubt whether they ever take fish of any size. McAtee (1919) thinks that fish composes only about 25% of the entire food. Crayfish, frogs, small fish (very minute fry at times), all sorts of insect larvæ and various vegetable material may be said to be representative (A. H. Howell, 1911; *et al.*). A stomach which I examined at Wenham Lake in late November, 1922, contained three or four dragon-fly larvæ and a large number of very small fish, the bones and scales of which were so tiny that they were only identified under a microscope. Another from Wenham contained only dragon-fly nymphs and caddis larvæ.



Mr. Brewster mentioned the food (autumn) at Umbagog Lake, Maine, as consisting mostly of insect larvæ, especially large species of *Dytiscus*, with some vegetable matter.

COURTSHIP AND NESTING. I think it probable that the mating takes place rather early in the spring, which is more in keeping with the habits of surface-feeding ducks than of the diving ducks. The migration, of course, is early and so is the nesting season and those few I have seen in New England in early spring were always paired. Courtship of a sort may be seen in late winter and probably continues up to April. As so little has been written about the display I cannot do better than quote in full some notes which Mr. Francis Harper made on the Potomac River, and kindly sent me, leaving out the account of the male's note which has been considered before: "The following observations were made on the Potomac at Mount Vernon on February 8, 1920. The weather was cloudy, with a light to brisk northwesterly wind, and a temperature of 32° or a little more. In addition to a flock of about 100, there were several small bunches of three to nine or ten individuals each. It was in these smaller bunches that I saw the courtship display. Certain scattered females appeared to be quite unmolested, perhaps not yet being in season (according to Millais' suggestion). Others, however, evidently had considerable attraction for the males. The latter were always in the majority in the small bunches, in the proportion of two or three to one, or six or eight to three.

"In swimming near or toward the female, each of her admirers keeps the white area of the crest expanded to the fullest extent, even with the head in normal position so that the anterior border of the white area appears nearly vertical. Every now and then he raises his head high several times in succession. The feathers of the sides of the head have the appearance of being puffed out at the same time. Meanwhile one of the males maneuvers at another, as if to discourage or ward him off. No violence was noticed, but at least once I saw the suitor nearest the female thrust his head forward and drive threateningly at the other. In swimming toward the female, the male often keeps turning his head directly at right angles, his purpose obviously being to show off his crest to better advantage.

"While watching a trio far off toward midstream, I saw one of the males repeatedly raise his head apparently to give two or three jerks of his bill (as he might act in trying to get something out of his mouth), then at once throw his head far back on his rump, with his bill doubtless upturned, in the manner of the Golden-eye. When, at length, one made a rush at the female, she dove, leaving her suitors forlorn on the surface. When she came up at a distance, and after a considerable interval, they took wing to her. Thereafter she kept on diving. Later I saw a female drive off a male now and then with open bill. She even seemed actually to attack a suitor, the two birds making quite a splash in the water.



"In a bunch of three males and a female, one of the former would dip his bill in the water about three times in succession, then rear up on his tail, so to speak; either this was done momentarily, without wing movement, or it lasted a little longer, while the wings were flapped. The movement brought into prominence the black breast-stripes and probably the ruddy flanks as well, and was doubtless indulged in at least partly for this reason. The breast-stripes show up well, however, in any position, whether in repose or in flight. The males keep their long tails slightly up-turned as well as somewhat spread, in a manner suggestive of a Ruddy."

The account of the display mentioned by Millais (1913) is inadequate. Dr. C. W. Townsend saw a captive pair going through a partial performance which he described in 1920.

The nesting season is very early in the southern States where, in Florida, a female was seen with a brood a week old, on March 28 (Brewster, 1878). Even more surprising was the finding of a mature egg in the oviduct of a female shot in Georgia on February 22 (W. W. Worthington, U.S. Biological Survey field-notes). In Maine, Mr. Brewster's (MS.) records for Lake Umbagog show the earliest full clutch to have been taken on May 25. In Illinois eggs have been taken on April 20 (Cobleigh, U.S. Biological Survey), and in southern Ontario on April 29 (Cooke, 1906), while in Arkansas young have been seen on the wing on June 22 (A. H. Howell, 1911). In North Dakota, Bent (1901-02) found that the young were all hatched by June 18, while in Minnesota young old enough to fly have been seen on June 21 and July 8 (U.S. Biological Survey notes). In Montana eggs have been taken on May 28 (E. S. Bryant, in Bent, 1923) and in Washington in May (W. L. Dawson and Bowles, 1909).

For its nest the Hairy-crown nearly always selects hollows in dead trees some distance from the ground, varying from fifteen or twenty to sixty feet. As noticed under Association, its tastes are so similar to those of both the Golden-eyes, the Carolina Duck and the Buffle-head that it often finds itself in competition with them. An abnormal location for the nest is described by Rinker (1899), who found one in Missouri on the ground under the roots of a big stump in a sort of cave fourteen inches deep; another one he found in the top of a hollow stump about ten feet high, the nest being about two feet down inside. In Washington, Bowles (in Bent, 1923) had some interesting experiences in inducing this duck to make use of nesting boxes. He writes: "I have never found a naturally located occupied nest of the hooded merganser, my rather limited experience being confined to nesting boxes that I put up for them. This was done through the kindness of Dr. G. D. Shaver, of Tacoma, Washington, who very kindly gave me entire use of his country estate near that city. The locality selected is a lake about half a mile in diameter, entirely surrounded by dense fir and deciduous woods, with a stream running in at one end and out again at the opposite end. At the head of the lake the stream runs through a large and heavily wooded swamp, in which I put up two of my boxes. A third was



put up on a dead tree standing in the middle of the lake, a fourth on a tree at the outlet, a fifth on the side of the lake, and a sixth on a lone, giant fir tree that stands on a bare hillside some 300 yards from the water at the end of the lake. All are about eighteen feet above the ground, or water, and seemed to cover as well as possible the nesting sites that might be suitable for these birds. Not to take up too much space, I will say that a set of ten eggs was taken from one of the boxes in the swamp at the head of the lake, a brood being reared in the other box there. A set of eleven eggs was taken from the box on the tree in the lake, the bird using the box on the lone fir on the hillside for her second, and this time successful, attempt at rearing a brood for the season. The box on the side of the lake showed no signs of being visited, down feathers on the entrance of the box at the outlet gave evidence that it had been thoroughly examined, although considered unsuitable for some reason. The birds are so exceedingly shy that I have never been able to see them enter their nests, but when leaving they come out at full flight, which would seem almost an impossibility under the circumstances. The eggs are just about the size, shape, and color of white billiard balls, and every bit as hard in their composition."

The clutch varies from six to eighteen in number, the average being about ten. Anything over twelve is very unusual and probably the work of two females. Mr. Brewster's (1924) observations showed that two females very frequently associate together and amicably nest in the same cavity. He even saw two females come out of one stub at the same time. The habit of frequently mingling the eggs with those of Golden-eyes and Carolina Ducks has already been referred to.

The eggs are remarkable enough to have aroused the interest of many oölogists. Bunyard (1917a) called attention to the fact that they are very distinct and unlike the eggs of any other species. In fact they are widely separated from those of other Mergansers, both in the thickness of the shell and in the arrangement of the pores. They are nearly spherical in shape, thick, hard and smooth and usually glossy. The pittings are widely separated, coarse and deep. In color the eggs are pure white, although often nest-stained. The measurements of 116 eggs, according to Bent (1923) averaged 53.5 by 44.9 mm. The maximum and minimum lengths were 57.5 and 50 mm., the maximum and minimum breadths 45.5 and 41.5 mm. The eggs are extraordinarily heavy in comparison with other ducks' eggs of the same size. The nest-down is grayish white, according to Bunyard.

Melanistic eggs have been attributed to this species by Peck (1896).

The only note on the incubation period is given by R. Owen (1866) who placed it at thirty-one days. This seems to me considerably too long, but it may be that this species is as peculiar in its incubation time as it is in many other ways.

Like other tree-nesting ducks, this one has been surrounded with the usual fables (?) about the mother carrying the young to the ground. But even more incredible, not to say ridiculous, is the account given of the male feeding the young during incuba-



tion (Preston, 1892). So far as I know, careful observations as to the drake's behavior during the nesting season have never been published. As he early assumes an eclipse plumage he almost certainly disappears during the summer, like the other Mergansers and Golden-eyes. Mr. Brewster (MS.) saw no males after the close of May at Lake Umbagog, and could not imagine what became of them. They were not seen again until mid-October, so that they may possibly make a northern excursion during the summer.

The mother bird behaves like the female of other ducks and Mergansers, executing many complex ruses to divert the attention of the intruder from her young. The young leave the mother when about two-thirds grown, and they, with the females, certainly migrate separately from and probably for the most part, earlier than the adult males.

STATUS. All over the eastern part of its range this bird has suffered tremendous diminution in the past forty years both as a breeding species and as a migrant. Mr. Brewster (MS.) in his Lake Umbagog notes, lays special emphasis on this reduction since 1889 and says that in his earlier visits it was easily the most abundant duck in summer. During numerous summer excursions in the Maine woods I myself failed to find any trace of breeding pairs (although in August, 1924, I saw a group of immatures) and I am inclined to think that it is now practically extirpated as a breeding species in the northern Maine woods. O. W. Knight (1908) classed it as an occasional breeder, and of course it may still breed in very limited numbers in the eastern counties.

The decrease of migrant birds in the vicinity of Cambridge, Massachusetts, since the college days of Samuel Cabot (1832-36) is commented on by Brewster (1906). My own records for Wenham Lake, Massachusetts, between 1899 and 1923, show a decrease of something like fifty to sixty per cent, almost as great as in the case of the Ruddy Duck during the same period. At Wenham they represented two to four per cent of all the ducks coming to the lake. There may possibly be a slight recovery in numbers during the past three or four years.

Probably this bird has disappeared as a breeding species from New Hampshire and Vermont, and it must be extremely rare if it breeds at all in central New York, judging from what Mr. Francis Harper and Mr. L. A. Fuertes have written me on the subject. Apparently it still breeds occasionally in the Adirondack region for Mr. Charles L. Dickert, a taxidermist of Saranac Lake, knows of one good "breeding place" near Saranac Inn, New York, and Mr. Harper saw an adult female and five very young ones on Falls Pond, Hamilton County, in June, 1910.

It seems reasonable to assume that this Merganser once nested throughout the Atlantic States from Maine to Florida but only one or two records of its original breeding status in the Middle States have ever been found (North Carolina). A



recent decrease in California is recorded by J. Grinnell, Bryant and Storer (1918) and by Mailliard (1921); and it is one of the rarest ducks in eastern Colorado judging by the records of the Kennicott Duck Club (Bergtold, 1924).

Owing to the fact that almost no shooting clubs keep records of the non-game ducks it is impossible to get an idea of their relative abundance in any one place. They are seldom shot unless better ducks are totally lacking. At the Swan Island Club, North Carolina, very careful records were kept of all species in the ten seasons from 1909-10 to 1918-19. During that period 633 Hairy-crowns are recorded, representing 2.5% of the total of all ducks shot. I have spoken of the reasons why this bird has a rather uncertain future under the first part of General Habits.

**ENEMIES.** Attention has been called to the fact that where pickerel or pike have been introduced into former trout waters all the breeding ducks have decreased. This may have been a factor in the diminution of the numbers of Hooded Mergansers in our northern States and in eastern Canada.

**DAMAGE.** This little Merganser has been accused by Elliot (1898) of being very destructive to trout. This seems wholly unjustified to me. It is not particularly partial to the kind of water which trout prefer, nor does it take fish of sufficient size to be economically a drain. As remarked under Food these birds get most of their sustenance from larvæ of insects, frogs and vegetable matter.

**FOOD VALUE.** Hollister wrote McAtee (1919) that he considered the flesh as good as that of any duck at Lake Delavan, Wisconsin. My only comment on such a remark would be that there must be something radically wrong with the good ducks of Delavan! I have eaten young Hairy-crowns many times in November and have given them to people who greatly appreciated them. It is true at this season they are not "strong," are usually fat and sometimes rank quite well with Lesser Scaups, young Golden-eyes or Buffle-heads. But they can scarcely be compared as a table delicacy with any of the surface-feeding ducks that have come from good feeding grounds at the corresponding time of year.

**HUNT.** Hairy-crowns are usually shot by sportsmen as a sort of last resort, to fill the empty spaces in the game-bag, or in order to test their skill on single birds flying over the decoys at a speed perhaps hardly attained by any other duck. The male, being so conspicuously beautiful, is often shot for his looks alone and thereafter does forlorn and dusty duty on the mantel shelf. Tame as they are and so apt to be found feeding in small enclosed waters, they frequently fall victims of the strolling boy shooter. Aside from the tremendous speed this can scarcely be classed as a "sporting" bird and may eventually have to be removed from among the shootable fowl.



BEHAVIOR IN CAPTIVITY. This Merganser is not often kept in collections of waterfowl, not as often, I think, as it should be. I dare say that it will live fully as long as the Smew does in European collections and it will probably do about as well as the Golden-eye. I do not think this bird has ever been sent to the Continent in a live state. The few specimens which I have seen in private collections have not lived more than a few months, but I doubt whether any special care was given to them.

HYBRIDS. One of the most remarkable of duck hybrids is a cross between this Merganser and the Golden-eye shot by Mr. Caleb Loring, Jr., near Scarborough, Maine, in May, 1853. "The bird," says Mr. Loring, "came in alone, passed his decoys, went by a small flock of 'Whistlers' and alighted alone in a place usually occupied by the 'Whistlers.' It dove perpendicularly like a Whistler, not obliquely" (S. Cabot, 1855). This specimen is still preserved in the collection of the Boston Society of Natural History.



## GOOSANDER

*MERGUS MERGANSER* LINNÉ

(Plates 96, 97, 98)

### SYNONYMY

*Mergus merganser* Linné, Systema Naturæ, ed. 10, vol. 1, p. 129, 1758.

*Mergus castor* Linné, Systema Naturæ, ed. 12, vol. 1, p. 209, 1766.

*Mergus gulo* Scopoli, Ann. I Hist. Nat., p. 69, 1769.

?*Mergus æthiops* Scopoli, Ann. I Hist. Nat., p. 70, 1769.

*Mergus asiaticus* S. G. Gmelin, Reise durch Russland, vol. 2, p. 188, pl. 20, 1774.

*Mergus rubricapillus* Gmelin, Linné's Systema Naturæ, ed. 13, vol. 1, pt. 2, p. 545, 1789.

*Merganser raucedula* Schaeffer, Mus. Ornith., p. 66, pl. 43, 1789.

*Merganser castor* Schaeffer, Mus. Ornith., p. 67, 1789.

*Merganser æthiops*, Schaeffer, Mus. Ornith., p. 67, 1789.

?*Merganser leucomelanus* Schrank, Fauna Boica, vol. 1, p. 238, 1798.

*Merganser raii* Leach, Cat. Mammals and Birds British Mus., p. 36, 1816.

*Merganser gulo* Leach, Cat. Mammals and Birds British Mus., p. 36, 1816.

*Merganser aldrovandi* Reichenbach, Avium Syst., Natatores, p. ix, pl. 7, 1852.

*Mergus major* C. F. Dubois, Planches Coloriées Oiseaux Belg., vol. 3, p. 268 and pl., 1860.

*Merganser merganser* Stejneger, Ornith. Explor. Kamtschatka, p. 176, 1885.

Additional synonymy under Geographical Races.

### VERNACULAR NAMES

*English:* Goosander, Greater Saw-bill, Goose Sawyer, Saw Goose, Jack-saw, Dunder, Merganser, Sparling Fowl, Buff-breasted Sheldrake, Sheldrake, Pond Sheldrake, Winter Sheldrake, Swamp Sheldrake, River Sheldrake, Breakhorn, Bracket, Weaser Sheldrake, Tweezer, Water Pheasant, Velvet-breast, Morocco-head, Fish Duck, Fisherman, Gozzard, Spear Wigeon, Wheezer.

*French:* Le harle, Harle commun, Grande ridenne, Gemble, Gimbre, Vignon anglais, Le harle bièvre, Harle blanc, Hère, Gièvre, Bec-scie, Hurlu, Grand harle, Grand bec-de-scie, Bièvre doré, Dgèfe, Bésie, Canart-serraire.

*German:* Grosser Säger, Gemeiner Säger, Gänsesäger, Ganstaucher, Tauchergans, Seerachen, Meerrachen, Strausstaucher, Taucherkiebitz, Kneifer, Kariffer, Merch, Winternörks, Ganner, Seerabe, Bottervogel, Scheldracke, Bieberente, Haubentaucher, Aschente, Vielfraas, Seekatz, Seegeiss, Muschelkönig, Baumgans.



*Italian:* Smergo maggiore, Mergo domenicano, Mergone, Garganello, Poloro, Erlon, Resegon, Fratton, Fus marcin, Geron, Gavetta, Marangon, Pescarott, Serolon, Seghettone, Sugherone, Siretta grossa, Anadi imperiali, Strallera, Pescaron, Imperga, Margun.

*Spanish:* Bech de serra gran, Trullo.

*Basque:* Ugarrantza, Gotzurria, Atakapenaria.

*Dutch:* Groote Zaagbek, Duikergans, Zaageend, Dubbele Zaagbek, Roséwaard, Korporaal, Boterbuik.

*Lapp:* Gussa-goalse, Kussa-koalsi.

*Russian:* Krahal bolshoi, Krokai.

*Polish:* Tracz hohol.

*Croatian:* Ronac oraš.

*Friesian:* Bunte dukelein, Saechbek.

*Icelandic:* Störa toppönd.

*Gælic:* Siolta bheag.

*Faroese:* Topandt.

*Danish:* Stor Skallesluger, Gul Skallesluger, Gulskraep, Skrokand, Skörand, Hav-gasse, Bögeskrække.

*Norwegian:* Lax-and, Stor Fiskand, Fagergaas, Stok-and, Mort-and, Skjor-and, Fiskand, Gul-önd, Stromand, Domskraka.

*Swedish:* Stor-skrake, Halskrake, Skräckfagel, Skräckand, Isand, Gulskräeka, Snip-and, Körfagel.

*Finnish:* Uukoskelo, Iso koskelo, Rökkä, Voikoskelo.

*Czech:* Morčák velki.

*Turki:* Ala ghaz aurdak.

*Slovene:* Ribič, Savščica, Velika savščica, Velika potaplsavec.

*Hungarian:* Nagy-bukó, Muszka récze, Muszka buvar.

*Tartar:* Balacha, Sus-chas.

*Ostiaks:* Koss, Sai, Hool.

*Bashkir:* Koshe.

*Lamut:* Octki.

*Tunguse:* Ochin, Ochigal.

*Yakutsk:* Chamiaghan.

*Samoyede:* Njaebu.

*Korean:* Jallal.

*Kuriles:* Túipe.

*Kamchatkan:* Tilti, Tettal.

*Giliak:* Ign-nga.

*Japanese:* Kawa-aisa.



## DESCRIPTION

**ADULT MALE:** Head and upper neck black with green and purple metallic reflections. Occipital feathers elongated but not into a pronounced crest. Lower neck and upper part of mantle white, this white continuous with the white of the lower parts. Remainder of mantle and most of scapulars black. Back, rump, upper tail-coverts and tail bluish gray. Lower parts, including flanks and sides, pure white, in life suffused with a delicate salmon pink (except on the lower neck) which fades in a short time to very light pink or cream color. Wing-coverts and extreme outer scapulars white except that the marginal coverts are black and the greater coverts are black on their bases forming a black wing-bar. Inner secondaries mostly white with fine black lines along their outer edges; outer ones black like the primaries. Tertiaries (all except one) black. Under wing mostly brown, but the central under wing-coverts and axillars white.

Iris carmine. Bill bright vermilion with the nail black. Legs and feet vermilion.

Wing 275–295 mm.; bill 55–61; tarsus 46–53.

Weight 3 pounds, 7 ounces to 4 pounds (1.56 to 1.81 kilograms) and probably more at times when extremely fat.

**ADULT FEMALE:** Chin white and lores often with a streak of whitish; rest of head and upper neck bright rusty brown with a conspicuous crest. Upper mantle slate-color in middle and white on sides. Scapulars, back, rump and tail slate-gray, many of the feathers with darker shaft stripe. Lower parts cream-white (pinkish in life) but flanks, sides of rump and outer under tail-coverts gray or partly gray. Wing-coverts gray except outer ones and the bases of the greater ones which are black. The white speculum is formed by the tips of the inner greater wing-coverts and the ends of the middle secondaries. Primaries black; tertiaries dark gray to blackish.

Females of this Merganser are difficult to tell in the field from the very similar-looking females of the Red-breasted Merganser. The head is usually a richer red color than in *Mergus serrator* and the red extends more around the under side of the neck, while the upper side is bluer in general tone. This species is much larger and the nostril is situated near the middle of the culmen instead of in the basal third of it (see also under Red-breasted Merganser).

Soft parts as in the male but not so brilliantly colored.

Wing 283–295 mm.; culmen 51–61; tarsus 46–53.

Weight 3 pounds, 4 ounces to 3 pounds, 8 ounces (1.47 to 1.60 kilograms) (specimens at Wenham Lake in December).

**MALE AND FEMALE IN FIRST (JUVENAL) PLUMAGE:** Resemble adult female but occipital crest not so long and a distinct whitish streak from under the eye to the lores. Lower neck and upper breast much grayer than in adult, and whole tone of upper side not such a clear slate-blue color. Lower parts nearly as in adult female. Tail-feathers blunt at tips.

Bill reddish brown but pale yellow on lower mandible. Legs and feet yellow.

**IMMATURE MALE:** At first nearly like and extremely difficult to tell from juvenal female. The tertiaries are said to be longer and in most specimens the median coverts bordering bastard wing more or less suffused pale grayish white (Witherby *et al.*, 1919–22). The young male goes through the first winter with little change and may easily be mistaken in the field for a female. Some vermiculated feathers may come in on the flanks and the area of white at the base of the neck increases. The mantle and scapulars become a good deal darker than they are in the female and the dark shaft stripes are not so prominent. The young male passes into its first eclipse, a plumage in which it is easily distinguished from the adult eclipse by the ash-gray instead of white wing-coverts.

**ADULT MALE IN ECLIPSE:** An adult male in early autumn taken in Iceland (specimen received from J. G. Millais) shows well a late stage of the summer plumage. Both wings and tail have been renewed





RED-BREASTED MERGANSER  
Female

Male

Female

GOOSANDER

Male







and are the same as in winter. The rest of the plumage is nearly as in adult female but the head and neck are a little paler and not such a rich brown; a few vermiculated feathers on lower flanks and sides of rump. The mantle is apparently always darker than in adult female (sepia or dusky brown) and in my specimen it is nearly black, a beginning of the winter dress. The lower parts are said not to have the brilliant salmon tint of full plumage.

Eclipse is carried late into the summer, even to mid-October (earliest adult plumage October 5; W. Brewster) and full winter plumage is not acquired until November; in the young birds (that is, those a year and a half old) probably not until later than this.

**YOUNG IN DOWN:** The downy young is scarcely to be told from that of the Red-breasted Merganser except by the characteristic mid-culmen position of the nostril. The upper surface is olivaceous brown, darkest on the back and rump. There are white patches on the wing-rudiments, sides of back and sides of rump. The lower parts including the chin and throat are pure white. The most characteristic thing about all Merganser young is the rich brick-red area on the sides of the face and neck often extending around the hind neck. There is a white band extending from the base of the culmen to below but not back of the eye. Underneath this a dark streak runs from the gape back until it merges with the reddish brown of the lores and face.

Millais thought that in these young all the "markings were less rich" than in the Red-breasted species but after examining very large series I can find no constant color characters.

## DISTRIBUTION

### BREEDING RANGE

IN Europe the Goosander nests as far north as Iceland, where it is generally distributed but only moderately common (Slater, 1901; Hantzsch, 1905). It is said to have once nested on the Faroes (Dresser, 1871-81) and since 1871 has become a regular breeding bird in Scotland. Nests have been taken in Perth, Argyll, Inverness, Ross, Sutherland and Aberdeen (Baxter and Rintoul, 1922). On the Continent it nests all over Scandinavia, but somewhat less commonly north of the Arctic Circle (Wallengren, 1854; Collett, 1873; H. J. Pearson, 1899; Schaanning, 1913). In Finland it is nowhere a common breeder, and though nests have been taken as far south as Helsingfors (Palmgren, 1913), it rarely nests even in central or northern Finland (Palmén, 1876; Dresser, 1871-81; Suomalainen, 1908; Finnälä, 1913; Montell, 1917).

South of the Baltic, the Goosander nests in Denmark (Kjärbölling, 1850; Dresser, 1886). In Germany it is known to have bred in Schleswig-Holstein (Kjärbölling, 1850), Mecklenburg (Wüstnei, 1902; Hesse, 1915a), Brandenburg (Schalow, 1915), Pomerania (Nau-  
mann, 1896-1905), Bavaria (Jäckel, 1891; Stresemann, 1910), Silesia (Kolibay, 1906) and commonly in East Prussia (Hartert, 1892). It appears to be a regular breeding bird in Switzerland, especially in the western cantons (Fatio, 1904; Zollikofer, 1905). A few probably nest in Poland, for they did so in the past (Taczanowski, 1888) and they still nest in Latvia (Sawitzky, 1899; Loudon, 1909) and in Esthonia (Loudon, 1909).

The breeding range in Russia is ill defined. Small numbers nest as far north as the Murman coast (H. J. Pearson, 1899a) and Russian Lapland (H. J. Pearson, 1904), as well as about the White Sea and Archangel (Seeböhm, 1882a; E. von Middendorff, 1891). Harvie-Brown (1876) speaks of it as a rare breeder about the lower Petchora. Farther south small numbers nest about Lakes Onega and Ladoga (Sievers, 1877) and Petrograd (Bianchi, 1907), though it is reported as a common nester in Novgorod (Bianchi, 1910). According to Sabanäeff (Harvie-Brown, 1878) it breeds in Tver and Perm, and according to Menzbier (1881) in Moscow.

Reiser (1888) found this species nesting in Bosnia, and Dombrowski (*fide* Millais, 1913) says some nest in Rumania. E. von Middendorff (1891) says a few nest about Baku on the Caspian.

Iceland

Scotland

Scandinavia

Denmark

Germany

Switzerland

Poland

Russia

Balkans



In Asia the Goosander nests in suitable places in the Kirgis steppe region (Nazarov, 1887; Suschkin, 1914) and all over eastern Turkestan (Landsdell, 1885; Menzbier, 1888). It is a particularly common breeder in the mountains, nesting throughout the Himalayas (Hume and Marshall, 1879; Baker, 1921), all over Tibet (H. J. Walton, 1906; Parrot, 1909; Schalow, 1908; Baker, 1921), in the Tian-shan (Schalow, 1908), very commonly in the Altai (Hesse, 1913; Poliakov, 1915) and in the mountainous regions of northwestern Mongolia (Lönnerberg, 1909; Suschkin, 1915). The breeding range to the north is but ill defined. It nests about the upper Jenesei and is found throughout the basin of that river, though not commonly (Seeböhm, 1879; Popham, 1898; Suschkin, 1913). Zitkov (1912) records the species from as far north as the Yalmal peninsula, breeding (?). In general it is safe to say that the breeding range extends northward as far as the tree growth and that this Merganser does not nest anywhere on the tundra. It nests regularly in the Sajon Mountains and about Lake Baikal (Suschkin, 1913), and no doubt along the course of the upper Lena, for it has been found nesting on the Wiljui (*fide* Taczanowski, 1893). There are few actual breeding records for the region east of the Lena, but it may be assumed that it nests everywhere in the wooded regions. Dybowski met with it everywhere from Lake Baikal to the sea (*fide* Taczanowski, 1893), von Schrenck (1859) found it not uncommon along the Amur, and Dörries (1888) states that it is very common along the Ussuri. Nikolski (*fide* Taczanowski, 1893) found the Goosander nesting on Saghalin Island and Stejneger (1898) says it does so on the Kuriles. A. T. von Middendorff (1853) saw specimens in the Stanowoi Mountains and Bianchi (1908) has recorded one taken in the Anadyr basin on April 20. In Kamchatka the species is not uncommon and breeds (Stejneger, 1885; Kuroda, *in litt.*). Stejneger (1885) found it rather scarce on Bering Island, but Bianchi (1909) records it as a common breeder there and Hartert (1920) has reported specimens taken in May and June.

Though the distributional maps of the United States Biological Survey include the southern coast of Alaska in the breeding range of the American Goosander, I have been unable to find a satisfactory breeding record for that region. Lockhart took a specimen at Fort Yukon (*fide* Baird, Brewer and Ridgway, 1884) but at what season I do not know. Bean (1882) took a specimen on Kadiak Island on July 13, and at the same time an egg "said to be of this species" was found nearby. Cooke (1906) records a specimen taken on July 24, 1896, at Iak Lake, and Finsch (1872c) has reported it from the Kenai region. Hartlaub (1883) has recorded a specimen taken near Chilcat on April 26.

In southeastern Alaska this species breeds in fairly large numbers (Swarth, 1911; Willett, 1914). Swarth (1922) reports them as fairly common at the mouth of the Stikine in late May. In northwestern Canada eggs have been found as far north as Lake Tagish in the Yukon (Cooke, 1906). To the east the species is an uncommon breeder north as far as Fort Resolution, Great Slave Lake (Preble, 1908). Harper (MS.) collected young, still unable to fly, about the delta of the Athabasca.

In British Columbia this Merganser nests on the Queen Charlotte Islands (Kermode, 1904) and on Vancouver (Swarth, 1912). On the mainland it nests in the Cariboo District (A. Brooks, 1903), about Okanagan and in many other localities (U.S. Biological Survey). In Alberta nests have been found about Jasper House, Canmore and Banff (J. and J. M. Macoun, 1909), and young have been taken at the junction of the Blindman and Red Deer Rivers (specimens in Museum of Comparative Zoölogy) while in northern Saskatchewan it was found to be common in the summer months along the Churchill River to Reindeer Lake (A. Buchanan, 1920). About Lakes Winnipegosis and Waterhen, as well as in other parts of Manitoba it is a common nester (E. E. Thompson, 1891; Bent, 1923), and Preble (1902) reports meeting with the species at Norway House, Oxford Lake and York Factory. Spreadborough (*fide* J. and J. M. Macoun, 1909) found it breeding about Missinabi and along the Moose River. In southern Ontario it nests commonly about Parry Sound and Muskoka (Fleming, 1901) and not uncommonly about Ottawa (C.W.G. Eifrig, 1910).



No doubt this Merganser nests all along the course of the St. Lawrence, for it does so in New Brunswick (Dresser, 1871-81; Downs, 1888; J. and J. M. Macoun, 1909) and on the New Brunswick Gaspé peninsula. In the interior of Labrador some possibly nest, though Low's (1913) statement that it is common and breeds in the interior seems open to question. Specimens occur in summer on the Labrador coast, north at least to Makkovik (C. W. Townsend and Allen, 1907; Hantzsch, 1908). Nests have been found in Newfoundland (Reeks, 1869; Arnold, 1912), on the Magdalens (Osgood, U.S. Biological Survey) and in Nova Scotia (U.S. Biological Survey).

In the United States the Goosander nests in many sections of Maine, northern New Hampshire and northern Vermont (G. M. Allen, 1909; etc.), as well as in parts of northern New York (Eaton, 1910). I have twice seen females, that gave every indication of having young about, on the upper Hoosatic River in western Massachusetts. There is no doubt that this species once nested much farther south on rapid rivers (Pennsylvania, see B. H. Warren, 1890) but many of our eastern streams were rendered almost unfit for fish a very long time ago owing to factories. None nests in Ohio or Indiana, but in Michigan nests have been found as far south as Kent County and Saginaw Bay, while on the North Peninsula it is an abundant breeder (Barrows, 1912; Wood, Smith, and Gates, 1916). Kumlien and Hollister (1903) state that it is said to nest in Door County, Wisconsin. It certainly does so in many parts of Minnesota (Hatch, 1892; Roberts, 1916) and in South Dakota (Cooke, 1906; Visher, 1909), though I find no record of its doing so in North Dakota. In Montana the American Goosander nests in the western parts, especially in Glacier National Park (Florence M. Bailey, 1918; A. A. Saunders, 1921) and it is a fairly common breeder in Wyoming (Grave and Walker, 1913; Cary, 1917). The breeding range in the mountains extends far south and includes Colorado (W. L. Sclater, 1912), northern New Mexico (Goss, 1891; V. Bailey, 1913) and northern Arizona (Swarth, 1914). On the Pacific coast it nests in the Sierra of California from Tulare County north (J. Grinnell, Bryant and Storer, 1918), as well as in Oregon (Woodcock, 1902) and Washington (W. L. Dawson and Bowles, 1909; Rathbun, 1915).

#### WINTER RANGE

In Europe the Goosander winters as far north as Iceland (Slater, 1901; Hantzsch, 1905). There is only one record of its occurrence on the Faroes (H. C. Müller, 1869) and it is rare on the Shetlands (Evans and Buckley, 1899), though in Scotland it is common enough, excepting on some of the islands on the west coast and in the Orkneys (G. R. Gray, 1871; Millais, 1913; Baxter and Rintoul, 1922). It occurs regularly in some numbers in England and Wales, though it is rare on the south coasts (Millais, 1913; Witherby *et al.*, 1919-22; etc.), and in Ireland it is scarce (Ussher and Warren, 1900).

On the Continent it is a regular winter bird on the southern coasts of Norway and Sweden (Wallengren, 1854; Schaanning, 1913) and in Denmark (Kjærbølling, 1850). Though it is found in East Prussia and Posen (Hartert, 1892; Hammling, 1917) it is far more common in central, western and southern Germany (Jäckel, 1891; Heussler, 1896; R. Blasius, 1896; Deichler and Kleinschmidt, 1896; Le Roi, 1906; etc.), as well as in Holland (van Oort, 1922) and Belgium (Dubois, 1886; Raspail, 1913). It is moderately common in northern France (Paris, 1907; Ternier and Masse, 1907; d'Aubusson, 1911), but very rare in Provence (l'Hermitte, 1916). Though there are no definite records of its occurrence in Portugal it is included in Barboza du Bocage's list (*fide* Dresser, 1886) and it has been recorded from the northern provinces of Spain, as well as from Valencia, Malaga and the Straits, and from the Balearics (H. Saunders, 1871; Irby, 1875, 1883; Reyes y Prosper, 1886; Arévalo y Baca, 1887; Aldaz, 1918). It is known to have occurred near Tangiers (Irby, 1875), as well as in Algeria (Loche, 1867). It is said to occur also in Tunis (J. I. S. Whitaker, 1905). Salvadori (1865) and Brooke (1873) speak of it as very rare in Sardinia and I find no

Iceland  
Shetlands  
British Isles  
Scandinavia  
Germany  
Belgium  
France  
Portugal  
Spain  
Algeria  
Tunis



record of its occurrence in Corsica. There is only one good record of its appearance on Malta (Despott, 1917) and it is a very rare bird in Sicily and in Italy everywhere south of the Apennines (Salvadori, 1886; Giglioli, 1886, 1889; Arrigoni degli Oddi, 1904).

On the lakes of Switzerland it is not uncommon in winter (Fatio, 1904) and specimens have been taken in the Tyrol (Althammer, 1857) and Styria (Seidensacher, 1864). Fritsch (1872) mentions it as occurring in Bohemia in winter and it does so regularly in Poland (Taczanowski, 1888; Katin, 1912). It occurs regularly also in Hungary (Aquila, 1895, p. 51) and in Transylvania (Danford and Harvie-Brown, 1875), but it is rare in Dalmatia (Kolombatović, 1903) and in Montenegro (Reiser and von Führer, 1896). It is equally uncommon in Greece (Powys, 1860; Lindermayer, 1860; Reiser, 1905) and in Bulgaria (Alléon, 1886; Reiser, 1894). Elwes and Buckley (1870) state that it occurs occasionally on the Bosphorus and Krüper (*vide* Braun, 1908) has recorded it from the western coast of Asia Minor. It has not, I believe, been found in Palestine, but a specimen was shot on November 27, 1907, near the pyramids at Giza (Nicoll, 1919).

In Russia the species is found during the cold months in the governments bordering on the Black Sea (Nordmann, *vide* Dresser, 1871-81), in Cherson (Brauner, 1894), Ekaterinoslav (Valkh, 1911) and Charkov (Czernay, 1852) and even north as far as Orel (Daniloff, 1864) and Kasan (Russki, 1893). It is common about Astrakhan in winter (Seeböhm, 1882) and on parts of the Kirgis steppes it is occasionally found (Nazarow, 1887). Seeböhm (1883) and Radde (1884) report it as common on both the Black Sea and the Caspian side of the Caucasus. It is a fairly common bird in Mesopotamia (Meinertzhagen, 1914) and in Persia (Zarudny, 1911). On the southern coasts of the Caspian, in Transcaspia and all over Turkestan large numbers pass the cold months (Radde, 1886; Severtzoff, *vide* Menzbier, 1888; Loudon, 1910; Gitnikov, 1910).

H. J. Walton (1906) speaks of the Goosander as resident in southern Tibet. It is certainly so in the Himalayas, where it winters in the low valleys (Hume and Marshall, 1879). In India the bird is confined to the northern half, being quite abundant in the highlands and extending south to Ajinere or perhaps even to Bombay in the west, and to the Godavari on the east. It is found throughout Assam and is said to be common in northern Burma. A specimen is recorded from Myityina (Hume and Marshall, 1879; Blanford, 1898; Baker, 1921).

In China the Goosander has been taken in western Yunnan (C. Ingram, 1912) and near Kiating (E. H. Wilson, 1913). Thayer and Bangs (1912) have recorded specimens from Szechuan and Hupeh and La Touche (1922) states that it is abundant in winter near Shasi in the latter Province. Blackwelder found it abundant in Shansi and in western Chili and David and Oustalet (1877) as well as H. A. Walton (1903) state that it is plentiful about Peking. In the coastal Provinces it is common in northwestern Fukien (La Touche, 1900). Along the lower Yangtse it is extremely abundant (Styan, 1891) and R. Swinhoe (1863a) speaks in similar terms of its status about Tien-tsin. Kleinschmidt (1913) has recorded it from Kiau-chow. According to C. W. Campbell (1892) it winters in Korea and Dörries (1888) states that a few winter as far north as the Ussuri country. Indeed, Radde (1863) saw specimens in the market of Irkutsk in December. Mr. Kuroda writes me that in Japan it occurs as far south as Nagasaki, but is not common about Tokyo. Whether it winters on Yezo or the Kuriles I do not know, but specimens have been taken on Bering Island in December (Hartert, 1920).

In North America the American Goosander has been taken in winter on Unalaska (Dall, 1874; L. M. Turner, 1886) but I cannot say whether it winters in other parts of Alaska. Presumably it does so along the southern and southeastern coasts. Specimens have been taken at Nushagak and Becharov Lake in October (Osgood, 1904). Some winter as far north as southern British Columbia (Kermode, 1904) and Vancouver (Taverner, 1917). In Washington it is common (W. L. Dawson and Bowles, 1909; Rathbun, 1915) and the









MAP 115. Distribution of  
Breeding range, dotted  
Sporadic records





sander (*Mergus merganser*)

Winter range, broken line  
marked by crosses (X)









MAP 115. Distribution of Goosander (*Mergus merganser*)

Breeding range, dotted line; winter range, broken line  
Sporadic records indicated by crosses (X)







same is true of Oregon (Anthony, 1886; Woodcock, 1902). J. Grinnell, Bryant and Storer (1918) speak of it as fairly common in California to the southern border, but I do not think it has been observed in Lower California. In the interior it occurs as far north as Montana (Florence M. Bailey, 1918). J. C. Merrill (1897) found it common at Fort Sherman, Idaho, though Rust (1915) speaks of it as rare in Kootenai County. Hoffman (1881) has recorded it from Nevada and W. L. Sclater (1912) says that considerable numbers winter in Colorado. Specimens have been taken in winter in Arizona (Scott, 1886) and Kennerly (*vide* Baird, Brewer and Ridgway, 1884) saw large flocks on the Boca Grande and Conalitos Rivers, Chihuahua, Mexico.

Oregon  
California  
Idaho  
Colorado  
Arizona  
Mexico

On the Texas coast this species occurs in moderate numbers as far as the Mexican border (Dresser, 1866; Strecker, 1912), but in Louisiana it is common (Kopman, 1921). Considerable numbers winter in the Mississippi valley, in Arkansas (A. H. Howell, 1911), but more commonly farther north in Missouri (Widmann, 1907), Kansas (Goss, 1891; Bunker, 1913; H. Harris, 1919), Iowa (Schroder, 1923) and Minnesota (Roberts, 1916). About the Great Lakes it is a regular and fairly common winter bird in Wisconsin (Kumlien and Hollister, 1903), in Illinois (Woodruff, 1907; W. I. and G. R. Lyon, 1923), in Indiana (A. W. Butler, 1898), in Michigan (Gibbs, 1879; Barrows, 1912), Ohio (L. Jones, 1903) and even in southern Ontario (Fleming, 1906), as well as in New York (Eaton, 1910).

Gulf Coast  
Central  
States

On the Atlantic coast this species winters in mild years as far north as Prince Edward Island (Cooke, 1906). It is uncommon in winter in Nova Scotia (Tufts, 1918), but is plentiful in New England, even in the extreme north, wherever there is open water (G. M. Allen, 1909; etc.). It is moderately common in New Jersey (W. Stone, 1909) and Pennsylvania (B. H. Warren, 1890), but farther south, in Maryland and Virginia, it is rather scarce (Kirkwood, 1895; G. Eifrig, 1904; Rives, 1890) and in North Carolina it is rare (T. G. Pearson, C. S. and H. H. Brimley, 1919). There is but one record of its occurrence in South Carolina (Bragg, 1912). W. W. Cooke (1906) says that it ranges rarely to Georgia and Florida but it must be extremely rare south of Cape Hatteras. The species does, however, stray to Bermuda (S. G. Reid, 1884).

Atlantic  
Coast

#### MIGRATION

ALTHOUGH many dates of arrival could be cited for far-scattered regions in both America and Europe they would only serve to tell us what we know already, that this is a very late migrant in autumn and an exceedingly early one in spring. In Massachusetts, although there are early records, the bird is not at all common until after November 1, the high tide of migration being usually in the middle or latter part of the month, depending greatly on the severity of the weather in the North. The first part of this migration is always composed of females and young of the year, while old males are rare before early December. This unequal migration of the sexes has been noticed in many different places and there can be no doubt about its being a universal phenomenon. Over the southern parts of the winter range males are rare all winter. This is true of our Atlantic and Pacific coasts, Ireland, the southern parts of the British Isles (?), Bulgaria, southern Styria, Italy, etc. (A. Brooks, MS.; Payne-Gallwey, 1882; Alléon, 1886; Seidensacher, 1864; Picchi, 1904). Moreover, even where males do occur in some numbers they are apt to be in separate flocks or in somewhat different localities.

The only thing which remains to be shown, is that the far-northern wintering birds are largely males. I have no direct information on this point.

As W. W. Cooke (1906) found, there is apt to be some northward movement in late February and there is activity in the Mississippi valley in March. March also sees these birds following up the retreating ice in New England and eastern Canada and they arrive on their breeding grounds from early to late April. Some individuals remain far south of the nesting grounds, even as far as Pass Christian, Mississippi (July 4, 1913) and Padre Island, Texas, in August (U.S. Biological Survey field-notes).



It is of course possible that males may make a sort of secondary excursion directly after the females have completed their clutches. All we know is that males are exceedingly scarce, or apparently absent from many breeding grounds in July, August and September. William Brewster saw none at Lake Umbagog, Maine, during all the summers he collected there. Millais was never able to obtain males in eclipse himself and only after many years did he receive some from Schiöler in Denmark. He once saw five in Argyllshire in September.

F. Harper (MS.) saw a flock of about twenty-one males in regular V-formation passing northward in the Athabasca delta region about the middle of June (too late for migration) and during all the rest of the summer not a single male could be identified. It is of course possible that males are able to keep completely out of sight, although present, but I am a little doubtful about it. It is possible that they repair to carefully selected, but inaccessible waters to moult, as we know to be the case in some other species. We do know positively that Mergansers, either males or immatures, summer in Alaska and on the north coast of Russia (Kolguev Island) far north of their breeding grounds (Trevor-Battye, 1895).

William Brewster called attention to another characteristic. It seems possible that considerable migrations may be performed by flying low along the courses of rivers and through lake systems instead of at high altitudes by more direct routes. He noticed this at Umbagog and at Concord in Massachusetts.

### GENERAL HABITS

LEONHARD BALDNER, the fisher and fowler of Strassburg, writing in 1653, thus aptly summarizes the characteristics of the Goosander: "This large sea-mew is also a kind of duck and is bigger by a half than the common wild duck; together with the feathers it weighs four pounds, but as meat it is not as good as the wild duck. This sea-mew feeds on fishes and is constantly diving under water. It can seize a fish and eat it even if it weighs half a pound, for the bill is narrow and the teeth on it are like a saw, with a crooked point or hook in front, with which it can lift and seize the fish very well indeed. They have a gut  $2\frac{1}{2}$  ells in length and a horned stomach. They build their nests in high trees near the water, but there are not many of them."

This, the largest of the Merganser tribe, is found all around the world and is grouped by systematists into three forms, European, Asiatic and American. In Europe, the bird is known as the Goosander, but here in America it is called by a variety of names. I think, however, that American Goosander is the best English name, for in this way the bird is less likely to be confused with the Red-breasted Merganser. The American race (*Mergus merganser americanus*) can scarcely be distinguished from the European (*Mergus m. merganser*) except by the much less-developed hook at the tip of the bill.

The Goosander may be found on either fresh or salt water, though it is typically a bird of rivers and lakes. Our New England name, Pond Sheldrake, is well given. They frequent especially streams with clear sandy or rocky bottoms, and they seem to have no objection to rapid currents, though they like quiet pools off the main streams. They will also stay on larger lakes, but are rarely seen on muddy waters anywhere. In very severe winters they, like many ducks, will take refuge on any



open water, even though it be a mere ice crack or spring. They spend the whole winter on northern rivers wherever the water is rapid, or warm enough to remain open.

WARINESS. No matter where found Goosanders are shy and well capable of looking after themselves. They are wilder than Red-breasted Mergansers and many times more intelligent than the little Hairy-crown (*Lophodytes*). We do not see in this Merganser any symptoms of confidence, even in the young birds when they first arrive in the autumn. Indeed, these are almost as shy as our Black Ducks, and should they trust themselves to crawl ashore in some secluded cove or on the tip of a rocky point they are just as hard to stalk as the wildest of surface-feeding ducks. Of course on the breeding grounds females with broods appear at times fairly tame, but when protecting young or eggs many of our wild-fowl appear much tamer than they really are. I dare say that the young Goosander gets educated early in life, for he spends the middle and late summer out in well-traveled water-ways where he is continually driven up or down by canoes or boats of one sort or another. Even when half grown he is far from a fool, seldom loses his head and will either hide skilfully or rush out from under the bank, and up or down the stream, whichever method appears most likely to remove him from danger.

William Brewster (1924) once succeeded in tolling a couple of these birds up to him by waving the branch of a tree with red leaves on it. He did not credit the species with very sharp eyes or ears and wrote of their indifference, when on the wing, to passing close to boats.

DAILY MOVEMENTS. Fishing as they do throughout the day it is very likely that they may go ashore or perch on rocks at night. But I have no observations of my own on their nocturnal doings. It is doubtful whether these or the Red-breasted species ever feed at night. The latter is apt to flight to safer or broader waters at dusk and I think the former species usually shifts its grounds in the evening passing up or down stream to some other locality. These little flights I have often seen in summer or early autumn in the rivers of northern Canada or New England, ploughing along without any regard for a canoe or a group of men standing on the shore and often passing within half a gun-shot of the silent trout fisherman.

GAIT, SWIMMING AND DIVING. On land Goosanders seldom go more than a yard or two from the water, although they are very fond indeed of coming ashore on beaches, rocks, and especially along the edge of the ice. Toward spring when the preening habits occupy a great deal of time in all ducks, these birds will sit for hours on the ice edge. Hume thought they could not walk, but such of course is not the case. They can do so with a heavy waddling step, but they do not care to walk far if they can



help it. Audubon noticed that they sometimes chased each other about on shore in the spring season, running actively for many yards at a time. It has been said that they can perch easily in trees. I must say that I rather doubt this. Possibly the female does at times perch on the edge of a stump, but most of the tree-nesting ducks, — excepting of course the true Tree Ducks (*Dendrocygna*) and the Mandarin and Carolina, — fly directly into their nest cavities and do not perch at all, even when their nests are placed well back from the water's edge.

In swimming, Mergansers can either float high as they often do when resting or in courtship, or they sink low as when on feed, sometimes pushing through the water with bill and eyes beneath the surface, apparently in order to locate food. Although it is almost impossible to confuse adult males of this and the Red-breasted species at almost any range their color patterns are so different, it is quite otherwise with females and immature birds. Personally, I do not think that it is possible to tell the females of the two species apart in the field. The whiter throat of the present species is far too indefinite a character to be of any use, and the larger size is not obvious except by the aid of a tape measure. A great many identifications of Mergansers in the field are undoubtedly wrong, and hence it follows that we have much yet to learn about the breeding and wintering ranges of the two species. Careful records at Wenham Lake, Massachusetts, which is only three miles from salt water, showed me that this species is about four times as common as the Red-breasted Merganser in autumn, but either species may be found in almost any sort of place at all seasons of the year.

The diving of Mergansers is characteristic, the birds often leaping high up just before the plunge, instead of quietly submerging. Flocks scatter very much during a dive, pursuing their prey in various directions and on coming to the surface swim together preparatory to another immersion. Often I have seen them turn about under water and come up facing in the opposite direction from that in which they went down. They undoubtedly like to fish in shallow water and soon after coming into a pond they will, if undisturbed, take to following the shore-line, keeping in water from two or three to ten or twelve feet deep. J. A. Munro (1923) clearly describes the difference in feeding and diving habits in the two species of Mergansers as seen in a large lake. He noticed that this species swims rapidly, with head submerged and follows the contour of the shore, three or four birds working together, and when fish are sighted, rushing along the surface with wings vigorously beating the water, with the object apparently of driving small fish into shallower water. The Red-breasted species, on the other hand, likes deeper water, and pursues a straighter course. This is absolutely in agreement with my own recollections. I do not know how long this bird can swim under water, but the usual dive is not long in time, although it may cover an astonishing distance. Time up to two minutes has been mentioned by older writers but I doubt very much if anything over forty-five



seconds is usual. Dewar's (1924) records show averages of well under thirty seconds and shallow water preferred. I have never measured the distance covered under water but should guess it as at least a hundred feet at times and possibly more. They often cover a long distance on the surface between dives, differing in this habit from most of the diving ducks.

Goosanders are very fond of following close along the edge of the ice and probably find better feeding there, no doubt pursuing fish far under the ice itself.

Several observers have seen them dive directly from the wing. I do not remember ever noticing this myself although they do often dive directly after they have alighted, often, as it seems, in sheer joy to be again on their favorite element after a long journey.

**FLIGHT.** A flight of Mergansers is characteristic, the long sharp bill and head, long straight low-hung neck and their closeness to the surface of the water being apparent to any one. Nevertheless, flocks at a little distance are not so easy to tell from Canvas-backs and I have been deceived more than once. Male Goosanders are easily recognized, they appear so white and the black head is prominent, but the female is most difficult to tell from that of the Red-breasted species and the difference in degree of whiteness of the speculum is not apparent unless the observer has a far sharper eye than I have.

The flocking of Mergansers is characteristic also, as Griscom (1922-23) has said. They tend to fly in long lines, with very regular intervals and little bunching toward the middle, low over the water. On the rivers also they do not care about rising out of gun-shot unless they have been very persistently hunted (as they are on some of our best salmon rivers) and they follow the windings of the channel with the utmost care.

Flocks of the American Goosander are never, so far as I have seen, especially large, and in autumn they migrate in small parties of three or four up to ten or fifteen. In winter I have seen about seventy-five gathered in one place, although this was probably an association of many little flocks. Taken altogether this bird is scattered over the country in small lots, or even as single birds, and does not gather into the great coastwise flocks which are typical of the Red-breasted species, especially toward spring. There should be mentioned here the tendency for many half-grown broods to pack together in August and September before they can fly, and to remain so for a good part of the summer, under the protection of only one, or at most only a few females. It is difficult to see what use such habits can have, but possibly there is a sort of mutual protection during the more helpless period.

The speed of flight is not great. I have no accurate observations to draw from, but should judge that it must be about the same as in many surface-feeding ducks.

In southeastern Alaska, Swarth (1911) has called attention to the habit individuals



have of rising high and circling about for hours at a time, "uttering at frequent intervals a most unmelodious squawk." I have never seen anything of the sort, but it may be something in the nature of a mating flight.

ASSOCIATION WITH OTHER SPECIES. A characteristic habit of this Merganser is its close association with the Red-breasted species. One finds broods in our rivers which are hopelessly mixed, and it is impossible to tell one from the other unless specimens are shot and examined. On migration and on the winter quarters the two Mergansers mix everywhere more or less, especially on larger lakes. It is rather remarkable that so far no hybrid has been found between the two. For the rest, Goosanders are not found mixed with other ducks. I do not think that the surface-feeding ducks ever like to have Mergansers, Grebes or Loons diving near them and they will frequently show signs of nervousness when these birds come too close.

In the winter in our eastern States there is some incidental mixing with Golden-eyes and the same is said to be true in other parts of the world, but on the whole this is an independent fowl and pays little heed to ducks, either surface-feeders or divers. In the autumn I often see these birds approach a flock of live decoys, apparently out of curiosity, for they very seldom care to stay among them. Occasionally a tired bird or two will find it convenient to haul out on the shore near a shooting-stand, evidently preferring some sort of company to complete solitude.

VOICE. The male is extremely silent and I doubt whether he ever makes any sound except during display. I have never heard the note except in early spring; it is not loud and one has to be fairly close to hear it. In my notes I have recorded it as a soft *gawk-gawk* and Dr. C. W. Townsend (1916) calls it a "quickly repeated purring note, *dorr-dorr* or *krr-krr*." S. E. Brock (1912a) heard only a low, soft, croaking note in courtship. Others have attributed harsh guttural or loud croaking cries to the male, but this is incorrect.

The female is much more given to making her presence known and the hard guttural *karr-karr* is heard sometimes in autumn as well as on the breeding grounds when she is accompanied by young. The "plaintive half hiss, half whistle" attributed to the female by Baker (1921) I have never heard.

The trachea is about twelve inches long and has two moderate expansions, one in the upper third and one in the middle. The upper dilatation is greatly flattened and the lower one less so. The striking thing about the anatomy, however, is the presence of an enormous irregular, right-sided *bullæ ossea*, "separated longitudinally on the right side by a membrane, from a very large recurvate tympanum, into which it opens below, and which is three-sided, the edges being bony and rounded and the sides membranous" (Yarrell, 1827; Macgillivray, 1852).



**Food.** The food of the Goosander, like that of the other Mergansers, consists primarily of fish, though at times water insects, mussels, frogs and even vegetable matter. Of fish almost any species will be taken: pickerel, trout, perch, salmon, carp, eels, barbel, roach, dace, bleak, chub and various minnows have all been found in the stomachs. These birds are exceptionally voracious and will devour incredible quantities of fish, frequently of very good size, and various writers tell of the birds' vomiting part of their meal when shot. Brewster (MS.) saw one throw up a live pickerel. A specimen which I shot on Wenham Lake on November 25, 1922, had in the stomach a pickerel no less than thirteen inches in length weighing exactly one-half a pound; another one contained a pickerel ten and a half inches in length weighing a quarter of a pound, to say nothing of three other smaller pickerel. In cases where fish of such size are taken they are usually swallowed head first and digested by stages, the process being very rapid. Other remarkable finds in stomachs include trout from seven to eight inches in length (J. C. Atkinson, 1862; W. L. Dawson and Bowles, 1909), a pike eight and a half inches in length, and in the same stomach digested remnants of another of the same size and of one considerably larger; an eel eleven and a half inches in length, which had been swallowed tail first (W. Thompson, 1851). J. Grinnell, Bryant and Storer (1918) record a specimen killed in California which contained five carp each four inches in length, and Baker (1921) speaks of a stomach containing fourteen fish weighing nine ounces together, and another containing eight ounces of fish; while W. Thompson (1851) speaks of a specimen taken in Ireland which contained forty-nine perch averaging three inches, besides a pike seven inches long. Macgillivray (1852) found eighteen trout in one stomach.

Finn (1919) fed to one in captivity forty fish about the size of small sprats at one time and found that in the castings there was no sign of the bones. Audubon, also, says that in captivity he has fed them more than two dozen fish about four inches long, four times daily.

O. W. Knight (1908) says that in Maine in winter he has found them eating mussels and other mollusks, shell and all, and that they were completely digested. Hartert (in Naumann, 1896-1905) noticed that in the breeding season they take caterpillars, cockchafers and burying-beetles, while Hantzsch (1905) found the males during the breeding season in Iceland feeding upon water plants. Collett (1873) reports finding the remnants of a frog in one stomach, and Jäckel (1891) says he once found the foot of a lamb (!).

William Brewster suggested the possibility of living fish being carried by Goosanders into waters where they had not been able to penetrate by natural methods. The idea was based on an apparently authentic instance of a dying bird vomiting up a living pickerel!

When feeding the Goosander usually swims along on the surface with the bill on the water or even with the whole head submerged, looking for fish. Swarth (1911)



says he has seen them carry out this movement and evidently filtering the water through the bill, as a slight "gabbling" noise was heard and obviously something was being retained. A great deal has been written of the concerted action of a company of these birds while fishing. They have been said to form in a semicircle in order to corner the prey, or to comb the water in a horizontal line. Hardy (in Bent, 1923) goes so far as to say: "As fast as they come up the hind ones run ahead of those in front of them and dive again, being in turn succeeded by others. . . . They feed exclusively on fish, several often uniting to capture one of large size." Most of such accounts as these are no doubt largely imaginary. Hume and Marshall (1879) say that these birds almost never dive *en masse*, and accurate observers are generally agreed that even when the bulk of a company dives the individual birds come up in far-scattered places and at varying intervals, in other words, when they have caught (or missed) their fish.

COURTSHIP AND NESTING. I think there is no finer sight on our inland waters in spring than a company of these grand birds, who are almost sure to be cruising around looking for the first open water long before the main body of the pond is freed from its winter blanket. The brilliant white males, their breasts tinted with the faintest blush of rose are now extremely active and often seen in full display. Or if the weather be cold and rough these gentlemen content themselves with merely washing up, splashing and diving, or crawling out on the ice to carefully preen their marvelously perfect plumage. A cove close to my house is a favorite haunt and here I have lain hidden and watched them by the hour. Now and again one chases another away with open bill, and sometimes a female will make a little run at some male, not favored at the moment. Perhaps this is all you will see, but if you arrive at a more favorable moment you may catch these great birds in full display. This has been described by William Brewster (1911a), S. E. Brock (1912) and C. W. Townsend (1916). Several males, and there seems often to be a preponderance of males with us in March, swim rapidly about in groups or regular lines, turning and returning at frequent intervals. There is often a side thrust with the bill, a dive or a short chase. The important part of the display, however, is a sudden back and upward jerk of the head until the bill (closed) is pointed straight up into the air when it is as quickly brought forward to the usual position. Or the bird may be seen to raise the breast and fore part of the body out of the water in a somewhat Mallard-like way and curve the neck downward so that the bill is pointed downward on to the breast. At intervals, too, the male shoots his legs out behind, throwing up a big jet of water and propelling himself forward with a jerk in a manner similar to the Golden-eye's.

These are the principal attitudes, but they are subject to infinite variety for no two people ever describe a display performance in the same way. There is no fixed order in any of these positions and often one or two of them are not seen at all.





DISPLAY ATTITUDES

(Upper) GOOSANDER

(Lower) RED-BREASTED MERGANSER







All this time the female may be quite inactive or if she wishes to incite the males to a more vigorous show she is apt to sink down flat on the water in the well-known mating position of the common Mallard. I have seen females in captivity making violent love to a male of a different species (a Smew in the case I have in mind), following him about in every direction and constantly stretching out flat on the water in spite of getting absolutely no response.

Display is seen in our latitude during the first warm days of February, but more constantly in March and no doubt the birds arrive on the breeding grounds mostly mated. On account of the unequal distribution of the sexes in winter many must delay pairing until well into April.

The nesting season is exceedingly variable, but generally is rather earlier than in most diving ducks. In southeastern Alaska newly hatched young have been taken as early as June 17 and the bulk of them appear by June 28 (Swarth, 1911; Willett, 1914). The United States Biological Survey field-notes show that on Okanagan Lake, British Columbia, young have been found on June 3, while in California they have been taken on May 21 (C. H. Townsend, in J. Grinnell, Bryant and Storer, 1918). In Alberta young have been found on June 24 (Dippie, in J. and J. M. Macoun, 1909) and in Minnesota as early as June 1 to 7 (Hatch, 1892). On the other hand a nest and eggs was taken near Lake Champlain on June 10 (U.S. Biological Survey) and others on islands in mid-June (Harper, 1914). Arnold (1912) reports a nest taken in Newfoundland on May 19. Very late-hatched broods are common all over the breeding area, unable to fly as late as the end of August or in September.

In Iceland the season seems to be much later, the eggs being deposited in the early and middle part of June (H. J. and C. E. Pearson, 1895; Hantzsch, 1905). In Scotland they nest much earlier than the Red-breasted Merganser. Clutches have been taken there by April 21 (Gilroy, 1909), while most of them are complete by the first week in May (H. Noble, 1908). According to Dresser (1908-09) eggs have been taken in Sweden in the last days of March, but in Finland most of the eggs seem to be laid in late May or early June (A. Newton, 1907). In Germany the season is, of course, early. In East Prussia the eggs are found from the end of April up to the middle of May (Hartert, 1892); in Brandenburg in late April (Hansmann, 1852), and in Mecklenburg as early as the Mallards. Young have been taken there on June 24 (Wüstnei, 1898). In Bavaria the young have been found on June 10 (Stresemann, 1910).

Of the breeding season in Asia very little is known, but Baker (1921) thinks that in Tibet the bulk of the eggs are deposited in June.

The Goosander is essentially a tree-nesting duck and where trees are to be found it will almost invariably nest in some hollow of a decayed trunk. In such cases the hollow chosen is usually at some altitude, even up to a hundred feet (W. L. Dawson and Bowles, 1909), but at times the hole will be within ten or twelve feet of the



ground and the eggs themselves actually on the level of the ground inside the trunk (Lee, 1896; Shaw, in Bent, 1923). In America the nests are almost always in trees, but at Lake Tagish, Yukon, a nest was found in a crevice of the cliffs (Bishop, 1900) and similar ones have been recorded from Oregon (Andrus, 1896). Raine (1904) tells of a very exceptional nesting colony on Gun Island, Lake Winnipegosis, Manitoba. The nests there were all placed far back at the end of dark passages under boulders on the highest part of the island, some being four to six feet back from the entrance. Ground-nesting habits have also been noticed on the Four Brothers' Islands, Lake Champlain (Harper, 1914).

In Iceland, where trees suitable for nesting are not available, the nest is located on the ground near running water, either in protected places among stones or hillocks, or in the vegetation and scrub (Hantzsch, 1905; Slater, 1901). In Scotland, too, ground-nesting is quite common, though any suitable hole, in trees, clefts of rocks, or under peat-hags and in banks of streams, will be utilized (H. Noble, 1908; Gilroy, 1909; J. H. Buchanan, 1880). In Germany tree sites seem to be absolutely the rule and I have not run across any records of ground-nesting in that country. On the other hand, in Finland and Lapland, Goosanders have always been known to nest both in trees and on the ground, and Dresser (1908-09) says that in that country he has found nests in hollows scratched in the ground and carelessly lined with grass. In Tibet they generally nest in holes in the banks, but about Gyantse willow trees afford suitable nesting places (Baker, 1921).

All tree-nesting ducks will on occasion make the nest in some extraordinary place, for want of a better one. Bent (1923) tells of finding two nests in the hay of an old deserted ice-house, and Lieutenant VanKammen (1915) reports finding two nests in depressions on the ground floor of a deserted lighthouse on an island off the north shore of Wisconsin. In Finland and Lapland they not infrequently nest in the artificial nesting-boxes put up by the natives (Dresser, 1871-81; A. Newton, 1907) and since the deforestation of the country they are said to make use of fishing huts, barns, sheds and lofts (Merrikallis, 1920). On the Murman coast H. J. Pearson (1899a) found two nests in unoccupied fishermen's huts which the birds entered through a broken window. By far the most remarkable nest on record is one reported by Zollikofer (1905). This nest, reputed to have been used for a number of years, was situated in a hole near the top of the tower of Werdenberg Castle, Switzerland. The nest was twenty-eight meters from the ground and the castle itself was on a hill sixty meters high. The brood of thirteen was hatched and evidently carried down by the mother, for the castle was surrounded by a high wall and the ducklings appeared in a hen-yard of the town, apparently after traversing the streets!

The average clutch numbers from nine to twelve eggs, but large clutches, the result, no doubt, of two females' nesting in the same hollow, as observed by Hocke (in Naumann, 1896-1905), are far from rare. Fifteen to twenty eggs are occasionally



found (H. Noble, 1908; Law, 1912; J. Grinnell, Bryant and Storer, 1918; Bent, 1923) and even thirty-six eggs are reported to have been found in one nest (Naumann, 1896-1905).

In color they vary from cream to buff or ivory yellow. A hundred and twenty-five eggs averaged 68.3 by 47.15 mm. (Hartert, 1920a), but ninety-three other eggs "from various collections" (presumably all American eggs) average only 64.3 by 44.9 mm. (Bent, 1923). The maximum and minimum lengths given by both writers are 74.5 and 55.4 mm., the maximum and minimum breadths 50 and 37 mm. The nest-down is grayish white and, together with numerous pure-white breast feathers and considerable rubbish, usually forms the nest itself.

Fresh eggs taken from incomplete sets in Manitoba and hatched in an incubator, showed an incubation period of twenty-eight days (Bent, 1923). Harper (1914) recorded a clutch on an island in Lake Champlain that hatched in twenty-eight days. Heinroth (1922) asserts that the period is thirty-two days. During this period the drakes usually desert their mates and leave the breeding grounds, though in parts of Iceland where only a few nest, the males seem to stay in the vicinity (Hantzsch, 1905). The female sits very closely and frequently cannot be driven out of the hole even when the tree is struck with a stick. Bent (1923) says that those which nest on the ground slip away before the intruder reaches the nest.

There are countless stories of female Mergansers carrying the young to the ground in their bills, between the bill and the breast or on their backs. While there may have been cases in which such methods were employed, they certainly are very exceptional. Ordinarily the young simply drop to the ground. Sometimes the distance to the water is not inconsiderable and the female is obliged to lead the young across country. I have already mentioned the brood hatched in the tower of a Swiss castle. In this case the young after reaching the ground, traveled down the castle steps and through the village street. Hocke (in Naumann, 1896-1905) also tells of a female which led her young through two kilometers of thick brush to a canal. The family swam up the canal to a lock and when the opportunity offered passed through and swam two more kilometers to the lake.

They are often deserted by their mothers when only a few weeks old and pack together in large numbers so that it is not uncommon to see one female with a perfect flotilla about her. Many of these may be of the Red-breasted species.

On the water the young are exceptionally agile and will flap and run away over the surface so fast that it is impossible to capture them, even with a canoe. Sometimes they seem to be dependent on the mother for food. A. M. Bailey (MS.) tells of watching a brood being fed in southeastern Alaska. The young were nearly as large as the female, but when she dove "all the young would start flapping over the water after her, so that when she came up, the whole band was there, each mouth open and every bird begging with throaty hisses and flapping wings. I saw her chuck a trout



at least eight inches long down one gaping maw, and immediately dive for another fish. When she came up, all the babies were awaiting her and so eager were they that the old bird climbed on to the bank as though to escape the flapping wings and look them over before feeding."

When very young the ducklings will occasionally climb upon the female's back, if tired, but the brood goes its own way as soon as it is on the wing and more often long before that time. The female then moults her wing feathers and temporarily becomes flightless. Mr. Francis Harper writes me that a female shot in the Adirondacks in August was evidently flightless.

The males are very hard indeed to find in summer. All who have seen them have remarked on their exceptional wildness and their retirement to out-of-the-way places. The males do not move south until later than the broods and probably in many cases do not really migrate at all.

We may be allowed to guess, without any very substantial evidence, that most, and possibly all young birds remain barren until two years old (eighteen to twenty months).

**STATUS.** It is not necessary to say much about the numbers of this species. No doubt its nesting area has been reduced. I dare say that with us it once nested commonly in our Berkshire streams in western Massachusetts and through the Appalachian rivers of Pennsylvania and even farther south (B. H. Warren, 1890; etc.). Audubon spoke of its breeding in Kentucky during his first residence in that State and there is no doubt that it once bred in Massachusetts. Deforestation may have had some effect in limiting its range but the greatest trouble was unquestionably the contact with man. Such a large and showy bird as this was sure to have had a poor time of it in the old days, when almost every boy had a gun and used it at any time of the year. I believe I have seen evidences of this Merganser breeding in western Massachusetts myself, although I have never actually seen a brood. They formerly bred in many of the Adirondack lakes, but were noted by Eaton (1910) as fast disappearing, due no doubt to the increase in motor-boats and summer cottages. The recent improvement in our laws gives this bird a great deal of protection for it does not become common over the more thickly settled regions until late November. Then, too, Mergansers are especially good at searching out protected spots in ponds and rivers where they spend the whole winter if they can get open water. Evidence of local decrease for various parts of the continent could be given.

Experiences in Finland show that this bird is not extirpated by deforestation, but can easily change its breeding habits to all sorts of ground-nesting sites. Indeed, this species seems very adaptable in every way and there is little fear that it will ever become scarce, so long as it is protected in winter and spring. There would indeed be no object in increasing its numbers because it would only bring complaint and retribution from those interested in trout and salmon waters.



**ENEMIES.** Mergansers are preyed upon by the same predatory birds that attack other wild-fowl and it seems hardly necessary to go into this in detail. A. Brooks (1922a) says that in our western States the Bald Eagle is very destructive and Yarrell (1884-85) mentions the fact that pike do away with a great many of the young. Like other ducks the Mergansers are frequently troubled with intestinal parasites and Naumann (1896-1905) gives a lengthy list of the species which have been found in the Goosander. Parrot (1909) mentions a specimen shot in Tibet the intestines of which were full to bursting with worms of the genus *Ligula*.

**DAMAGE.** The Goosander, being the largest of the Mergansers, is the most destructive to fish. Millais (1913) says that the damage caused in Scotland is very considerable and Maxwell (1904) says he shot a specimen which contained two pounds of trout ova. In this country the situation is very similar. J. Grinnell, Bryant and Storer (1918) quote Mr. W. H. Shebley, Superintendent of Hatcheries for the California State Fish and Game Commission, who says: "I have killed individuals on our trout ponds gorged with trout so that they were unable to swallow another one. We consider them one of the worst of the fish-eating birds." Complaints are fairly general from all salmon and trout waters in our northern States and Canada. In East Prussia, where the Goosander breeds commonly, its numbers are kept down by taking most of the eggs from the nests (Floericke, 1898).

While admitting that this Merganser causes no inconsiderable damage to our game fish there is something to be said in its favor, for it must be remembered that predatory as well as edible fish are taken as food and that the numbers of pickerel and pike are regularly depleted through its agency. Nevertheless it should not be allowed to become too numerous on trout or salmon rivers. Provision should be made in the law, allowing protective measures on valuable waters. A report on the economic status of our fish-eating birds by the U.S. Biological Survey is now in preparation.

**FOOD VALUE.** Most sportsmen who have tried to eat Goosanders are agreed that they had better be left alone, and that they can be assigned a prominent place in the ranks of the thoroughly inedible and unpalatable birds. As for the old birds, Hume and Marshall (1879) say: "If they are skinned, soaked in two or three waters, and then stewed with onions and a little Worcester sauce, they will furnish an abundant meal to a hungry man," to which Baker (1921) cynically remarks: "Probably it would, or for *several* hungry men." About all that can be said is that the Goosander can be eaten in a case of necessity. So renowned is it for its rank flavor, that there is an old French saw:

A qui voudroit régaler diable,  
Il faudroit bièvre ou cormoran.



The young in early autumn are much milder in both taste and smell than adult birds. Some have even spoken of them as palatable (Millais, 1913; Bent, 1923; Brewster, 1924)!

HUNT. Although not a sporting bird in any sense, its size and beauty often expose it to shooters who class all water birds as "ducks." In certain places they are greatly frowned upon by the guardians of salmon rivers and prices have even been placed on their heads. Where they are numerous enough in small rivers it is easy to kill a few by having a gun stay in some narrow pass and getting helpers to drive the birds up or down. But there are apt to be long waits and not many can be shot in one day. I have remarked, with others, that it is easier to drive them up-stream than down, and that when passing up they fly a good deal lower. While they are still unable to fly it is possible to destroy a good many if you can find where the large packs of flappers are gathered. At the same time it is rather too bad to have to shoot such splendid birds as these.

Although Goosanders are wary, they love to hunt close along a shore-line, and it is often possible, as it is with Golden-eyes, to run down upon them between dives and get shots at them when they rise. It is rather curious that they should ever come within gunshot of one of our New England duck-stands, but they seem to be often attracted by a large flock of live decoys, especially single ones, and they are quite apt to "look things over" at least once. A few Goosanders, but not many, were shot with Red-breasted Mergansers over decoys during winter and spring in tidal creeks and estuaries. On the whole they are well able to hold their own anywhere, and as the taste for strong "gamey" meat diminishes, all Mergansers and Scoters will be hunted rather less than more.

William Brewster (1924) gives an interesting account of their pursuit on the inland waters of Maine.

BEHAVIOR IN CAPTIVITY. The Goosander has been occasionally kept in zoölogical gardens ever since records of such collections have been made. It was among the water-fowl on the ponds of Versailles in the time of Louis XIV (Loisel, 1912) and it was kept in the London Gardens from 1864 on. It has not done well there, according to P. L. Sclater (1880) though the average length of life of five specimens was two years and eleven months, one living to seven years (P. C. Mitchell, 1911). I saw one or two in the Amsterdam Gardens in the spring of 1922 and they looked in good condition and were active. One even laid herself out to win the affections of a male Smew. There was a good-looking pair in the London Gardens in July, 1924, that had been there since early January. The male was in partial eclipse, ragged looking, and his bill had lost almost all the carmine color. This total loss of bill color was probably more or less pathological although one would expect a reduction of brilliancy at this "off" season.



Notes on the care of these birds in confinement are very meager indeed. Wagner (1862) tells of catching them in a net in Germany. He says at first they refused to eat and had to be crammed with fish. He found it necessary to put a rubber band around the bill to prevent their throwing the food up again. After five or six days he crammed them with calves' liver, and then with lungs and after ten days took off the band, whereupon they ate fish of their own accord. They became so tame that they would eat from the hand. About two-thirds of the number died in getting accustomed to the food but the other third did well and would eat even bread and vegetable food.

Zollikofer (1905) tells of his attempt to rear four of the young which had been hatched in a castle tower in Switzerland. A hen was used to act as foster mother and the young were at first kept from water. They were very shy and again and again climbed up the smooth wooden side of the box in which they were placed. They refused to eat in the box, but when put in the water ate greedily. At first they were fed on ant larvæ, and in the second week turnips, raw and cooked beef hearts, dog biscuit soaked in milk, and curds were added. Gradually they were also given horse meat and prawns. One soon died, unable to keep its feathers oiled, and a second followed soon after. On dissection it appeared that the latter had contracted tuberculosis and large pea-sized abscesses were found on the lungs, stomach and kidneys. The two remaining birds were doing well at the end of a few months, but were rather troublesome. Indeed, they were accused of having maltreated and killed a half-grown Carolina Duck on the same pond. In this connection it may be worth mentioning that one Goosander kept in Stockholm, successfully resisted the attacks of a Swan. It became very tame, but soon died. Dissection showed that the intestines were full of large tape-worms of the genus *Ligula* (Grill, 1863).

**HYBRIDS.** Wild-killed crosses between this species and the Mallard and also with the Common Golden-eye are on record (Suchetet, 1896).

#### GEOGRAPHICAL RACES

##### GOOSANDER

##### *MERGUS MERGANSER MERGANSER* LINNÉ

*Mergus merganser* Linné, Systema Naturæ, ed. 10, vol. 1, p. 129, 1758.

**CHARACTERS:** The nail of the bill is very sharply bent down forming a distinct hook, nearly right-angled in shape. The black wing-bar on the greater coverts of adult males is concealed by other white coverts.

**RANGE:** Old World from western Europe to Kamchatka and Japan; south in winter to Mediterranean region and China.



## AMERICAN GOOSANDER

## MERGUS MERGANSER AMERICANUS CASSIN

*Mergus americanus* Cassin, Proc. Acad. Nat. Sci. Philadelphia, vol. 6, p. 187, 1852.

CHARACTERS: Like the Goosander of the Old World but the nail with a less distinct hook and (in adult males) the black wing-bar formed by the bases of the greater coverts exposed, at least on its outer aspect.

RANGE: North America.

## ORIENTAL GOOSANDER

## MERGUS MERGANSER ORIENTALIS GOULD

*Mergus orientalis* Gould, Proc. Zool. Soc. London, 1845, p. 1.

*Mergus pusillus* Eyton, Synopsis Anatidæ, p. 138, 1869.

*Merganser comatus* Salvadori, Cat. Birds British Mus., vol. 27, p. 475, 1895.

CHARACTERS: Bill somewhat shorter and a good deal lighter in appearance; in males 51–57 mm., in females 46–49. Wings of males 275–285 mm.; of females 244–270 (plus?). Tarsus of males and females also a little less than the average for the European Goosander.

In the males there is a tendency for the long white inner secondaries to have somewhat broader black edges on their external webs. Color differences for the female are not apparent in the small series which I have examined, and I am inclined to think that they are not of any constant value.

RANGE: Afghanistan and Himalaya to Tibet, Turkestan and Altai region; south in winter to northern India, northern Burma, probably also to central China (Szechuan) and perhaps at times even farther to the eastward, where it may mingle with the typical Goosander (*M. m. merganser*) of Japan and China.

REMARKS: The existence of a smaller or slightly marked race in central Asia has long been noticed, but the color characters given for it do not seem to be of constant value. It is certain, however, that the group of birds from the central Himalaya, the Altai Mountains, India, and northern Burma have a somewhat smaller and more especially "lighter" looking bill and are *on the average* a little smaller in the other measurements. It seems that some birds from central China (western Szechuan) may belong to this race, for there is a very small-billed female in the Museum of Comparative Zoölogy collected by W. R. Zappey, December 8, 1908. But six others from this same region are typical of the European Goosander.



## RED-BREASTED MERGANSER

*MERGUS SERRATOR* LINNÉ

(Plates 96, 97, 98)

### SYNONYMY

*Mergus serrator* Linné, Systema Naturæ, ed. 10, vol. 1, p. 129, 1758.

*Mergus serratus* Brünnich, Ornith. Borealis, p. 23, 1764.

*Mergus albellus* Scopoli (*nec* Linné), Ann. I Hist. Nat., no. 89, 1769.

*Mergus leucomelas* Gmelin, Linné's Systema Naturæ, ed. 13, vol. 1, pt. 2, p. 546, 1789.

*Mergus niger* Gmelin, Linné's Systema Naturæ, ed. 13, vol. 1, pt. 2, p. 546, 1789.

*Merganser serrator* Schäffer, Mus. Ornith., p. 66, pl. 44, 1789.

*Merganser niger* Bonnaterre, Encyclop. Méthodique, vol. 1, p. 104, 1790.

*Merganser cristatus* Leach, Syst. Cat. Mammals and Birds British Mus., p. 36, 1816.

*Merganser serrata* Stephens, General Zool., vol. 12, pt. 2, p. 165, 1824.

*Mergus castor* Butler (*nec* Linné), Stray Feathers, vol. 5, p. 323, 1877.

### VERNACULAR NAMES

*English:* Red-breasted Merganser, Red-breasted Goosander, Sheldrake, Salt-water Sheldrake, Saw-bill, Sawyer, Shelduck, Spear Widgeon, Sea-robin, Pied Sheldrake, Pheasant, Pheasant Sheldrake, Fisherman, Fishing Duck, Gar-bill, Hairy-crown, Hairy-head, Herald, Harle Duck, Earl Duck, Land Harlan, Bardrake, Scale Duck, Gray Diver, Popping Widgeon, Water Hen, Skeld Duck, Jackawake.

*French:* Harle huppé, Harle à manteau noir, Moyen bec-de-scie, Couas, Gièvre, Dgèfe, Viard, Ripoupée, Hurlu, Harle à poitrine rousse, Sechotier, Bec-scie de mer (Louisiana).

*German:* Mittlerer Säger, Rotbrüstiger Säger, Sägeente, Sägeschnäbler, Stechente, Taucherkiebitz, Halbente, Meerrachen, Seerachen, Schlichente, Schluchente, Langschnabel, Kneifer, Fischtreiber, Nörks, Scharbeje, Seekatz, Spiesser.

*Italian:* Smergo minore, Mergo oca, Smergo segatore, Smergo a becco lungo, Resegon, Fus marein, Serola, Pescarott, Farfisetto, Rasegatt, Gavetta, Marangon, Svasso, Sugherone ciuffuto, Muserretta, Lavuraturi, Scoccalettu.

*Spanish:* Serrata, Mergo cristado, Pato de sierra, Bech de serra mitja, Merganso, Anguilor de Monyo.

*Basque:* Ugarrantz lumandorduna.

*Portuguese:* Merganso, Serzeta.

*Dutch:* Middelste Zaagbek, Kleine Duikergans, Pinduiker.

*Friesian:* Bunte Dukelein, Saechbek.



*Danish:* Toppet Skallesluger, Topskrække, Bögeskrække, Fiskand, Stromgoas.

*Gaelic:* Siolta, Sioltain.

*Faroese:* Topandt.

*Icelandic:* Litla topönd, Hrafnstönd.

*Norwegian:* Mindre Fiskand, Siland, Spiland, Mortand, Stromand, Liden Fiskand, Skraekja, Skraekan.

*Polish:* Tracz długodziob.

*Swedish:* Pracka, Smaskrake, Pracknisse, Stenskrake, Skräcka, Ard, Snipand, Vipand, Bergand, Fiskand.

*Lapp:* Vuokta goalse, Vuokta koalsi, Karikoskelo.

*Finnish:* Pikkukoskelo, Tukkakoskelo, Juhikoskelo, Ajava.

*Russian:* Krahal, Morskoi krahal, Krahal dlinonosoi.

*Czech:* Morčák prostřední.

*Hungarian:* Örvös bukó.

*Croatian:* Ronac brskavac.

*Slovene:* Savski potapljavec, Srednji.

*Arabic:* Kangajh.

*Maltese:* Serra.

*Tunguse:* Tocha.

*Japanese:* Umi-aisa.

*Labrador Indians:* Oushuk.

*Eskimo:* (Baffin Land) Pai, Paik, Pait; (Alaska) Puik, Paiyik; (Greenland) Paik, Nyaliksak, Nujalik, Arpajek, Asakek.

## DESCRIPTION

**ADULT MALE:** Head and upper neck black with green and dark-blue metallic reflections. Feathers of crown and occiput black, elongate, forming a double semi-erect crest which is a prominent field-mark. Remainder of neck white except for a black line from the occiput down to the upper mantle. Mantle and scapulars black, except for a tuft of white feathers with black margins on each side and some white outer scapulars. Back dull brown shading into the gray vermiculated pattern on the lower back, rump and upper tail-coverts. Tail brownish, the feathers more or less silvered with slaty-blue color. Upper breast and sides of breast pale pinkish brown streaked with blackish. Remainder of lower parts cream-pink except the flanks and sides of rump which are finely barred and vermiculated with wavy black lines. Marginal outer wing-coverts very dark gray, central ones and the tips of the greater row white. There are two black bands on the speculum, one formed by the bases of the greater coverts and one by the bases of the outer secondaries. Inner secondaries white with black outer margins; tertials black. Primaries dark brown, under wing-coverts and axillars white.

Iris carmine. Bill with nostril well within basal third; bright red in color but blackish down center of culmen. Legs and feet red.

Wing 240–250 mm.; bill 50–61; tarsus 44–47.

Weight 2 pounds, 10 ounces to 2 pounds, 14 ounces (1.19 to 1.20 kilograms) (Gladstone, 1922).

**ADULT FEMALE:** Similar to the female of the Goosander and not always to be distinguished from that



species in the field. The sides of the head are usually, however, a much paler red and the white of the chin and throat does not usually form so distinct or clearly defined a white patch as it does in the female of the Goosander. The head-color is not sharply defined at the neck but merges without a break into the color of the mantle and upper breast. The upper surface is not such a brilliant blue slate-color and the scapular feathers lack the dark central shaft stripes. These are perhaps the best field characters. The nostril position is always diagnostic: in the basal third of the culmen, not in the central third.

Iris red. Bill duller than in male. Legs and feet nearly as in the male but less brilliant.

Wing 215-230 mm.; bill 50-56; tarsus 44.

Weight 2 pounds, 3 ounces (0.99 kilograms; one only at Wenham Lake, November), but probably at least up to 2 pounds, 8 ounces or 2 pounds, 10 ounces (1.13 to 1.19 kilograms).

**MALE AND FEMALE IN JUVENAL PLUMAGE:** Very similar to adult female but crest shorter. Upper parts somewhat grayer and tail-feathers blunt at the tips. Other characters too trivial and irregular to be of service in picking out young birds in this plumage.

**IMMATURE MALE:** At first only to be told from females at the same age by the larger size. Some plumage differences and some minor differences in the colors of the bills between the two sexes have been described by other writers. The progress to maturity is a slow one, as it is in the Golden-eye and the Goosander, but there are usually some indications of secondary sex characters by late December. These are as follows: some black feathering coming in around the eyes or on the chin and throat, white feathers in the neck region or elongated black feathers on the crown. The mantle may begin to show darker coloring and vermiculated feathers may appear on the sides and flanks. Great variation is seen in the time of assumption of these beginnings of the adult dress. Some young males show little change up to February, others many slight changes, but the immature wing always distinguishes these first winter males from eclipse or semi-eclipse adult males.

**ADULT MALE IN ECLIPSE:** As Millais noticed, this Merganser is apt to begin to change into summer plumage very early in the spring, although this is not the rule. I have a mid-March specimen before me which has already lost most of the black feathering of the head. Many other specimens, of course, show no change up to early May. In the full eclipse the general body- and head-coloring is almost exactly like that of the adult female, but the white outer wing-coverts at once distinguish it. The crest is shorter than in the adult female and the mantle and scapulars are darker in tone. There are other minor differences which need not be mentioned here. The moult back into adult winter plumage is not complete until late autumn, November to January.

**YOUNG IN DOWN** (see Plate 96): Like the young of the Goosander in coloration and probably not to be distinguished except by the more basal position of the nostril.

## DISTRIBUTION

Of all the Mergansers the Red-breasted has the widest distribution, ranging through all the temperate and northern parts of the New and the Old World.

## BREEDING RANGE

In North America it nests as far north as Alaska. L. M. Turner (1885, 1886) and Dall (1874) report it nesting on the Near Islands, on Amchitka and Atka. Nelson (1887) found nests on St. Alaska Lawrence Island and says it nests all the way from Sitka to Icy Cape. It is very rare on the Arctic coast of Alaska (W. S. Brooks, 1915) though it breeds there (specimens in Museum of



Comparative Zoölogy) and it has been seen at Point Barrow (Nelson, 1885). About St. Michael's it used to nest commonly and some still breed there (Dall and Bannister, 1869; L. M. Turner, 1886; F. S. Hersey, 1917). Mr. H. B. Conover tells me that his party found it nesting in the Hooper Bay region south of the Yukon delta in the summer of 1924. Osgood (1904) found great numbers nesting about the base of the Alaska peninsula; it also nests on Kadiak Island (specimens in Museum of Comparative Zoölogy) and Willett (1914) states that the species is fairly common and nests in southeastern Alaska. On the upper Yukon, Blackwelder (1919) found it a rather common breeding bird.

In northwestern Canada the breeding range extends north to the Arctic coast at the delta of the MacKenzie, though rarely at other localities (Preble, 1908; Stefánsson, 1913). R. MacKenzie MacFarlane (1908) has found it nesting about Fort Anderson and Preble (1908) met with it along the lower MacKenzie and commonly about Great Bear Lake. In the west, Osgood (1909) found it fairly common on the Pelly and MacMillan Rivers, where the species probably nests. It was quite plentiful in July and August on Great Slave Lake and on the lakes to the east as far as Clinton-Colden (Seton, 1911) and Rae (British Museum) took a specimen at Repulse Bay. To the south of Great Slave Lake it nests less commonly in the west, though Mr. Francis Harper (MS.) found it on the Athabasca delta in July and took downy young near Moose Island and about the Beaver River.

Kermode (1904) says the Red-breasted Merganser breeds in British Columbia, but he gives no specific localities or dates. J. and J. M. Macoun (1909) claim to have found it nesting in the south along the Columbia River and Preble (U.S. Biological Survey) reports it nesting in the north in the Babine Mountains. I find no records of breeding in Alberta beyond the statement of Dippie (in J. and J. M. Macoun, 1909) that the species was found nesting on Buffalo Lake. Eastward, in Saskatchewan, it has rarely been found nesting, though A. Buchanan (1920) took a young bird in down on the Cochrane River and found a nest on a rocky island in Reindeer Lake. In Manitoba nests have been found about Lakes Winnipeg and Manitoba and about Shoal Lake (Raine, Dippie, in J. and J. M. Macoun, 1909; U.S. Biological Survey). To the northward, in Keewatin, the species is a common breeder on the barrens. Along the coast of Hudson Bay it has been taken as far north as Cape Eskimo, Fort Churchill and York Factory, as well as about Fort Severn and Trout Lake (Preble, 1908; U.S. Biological Survey). Little is known of the breeding status in Ontario. The U.S. Biological Survey has a record of breeding for the Lake of the Woods and Fleming (1901) thinks it nests in the Parry Sound and Muskoka districts about Georgian Bay. C. W. G. Eifrig (1910) reports it as a rare nester about Ottawa. On the Labrador peninsula it nests commonly in the interior (Low, 1913) though not a plentiful breeder in the northeast about Ungava Bay (Hantzsch, 1908). On the eastern coast nests have been taken at Port Burwell, Okak, Hopedale and Grosswater Bay, as well as at Battle Harbor and Sloop Harbor on the south coast and on Anticosti Island (C. W. Townsend and Allen, 1907; Schmitt, 1904; U.S. Biological Survey). It is a common breeder in Newfoundland (Reeks, 1869; Porter, 1900), on Anticosti (specimens in Museum of Comparative Zoölogy) and on the Magdalens (Cory, 1878; Bishop, 1889) as well as in northern New Brunswick (Chamberlain, 1887; Philipp and Bowdish, 1917) and in Nova Scotia and on Sable Island (Dwight, 1895; Tufts, 1918).

In the eastern United States the Red-breasted Merganser nests in northern Maine (O. W. Knight, 1908) and very doubtfully on the coast of Essex County, Massachusetts (C. W. Townsend, 1918). I have seen immature birds off the south end of Plum Island, Ipswich, in August, apparently unable to fly. I do not know where these could have been bred. Mr. Outram Bangs tells me that in the seventies it nested on Buzzards Bay, Massachusetts, and that he collected a downy young one there, which has since been lost. Other, but not wholly conclusive, evidence of nesting on the south shore of Massachusetts is given by Forbush (1912).

According to Eaton (1910) a few pairs nest in the Adirondacks, but there are no breeding records









MAP 116. Distribution of Red  
Breeding range, dotted  
Sporadic records





sted Merganser (*Mergus serrator*)

Winter range, broken line  
Crossed by crosses (X)









MAP 116. Distribution of Red-breasted Merganser (*Mergus serrator*)

Breeding range, dotted line; winter range, broken line  
Sporadic records indicated by crosses (X)







for western New York, Ohio or Indiana. In Michigan the species nests everywhere from Saginaw Bay north (Barrows, 1912; Wood, Smith and Gates, 1916) and on the west side of Lake Michigan it is a very common breeder about Green Bay (Kumlien and Hollister, 1903; Strong, 1912; H. H. T. Jackson, U.S. Biological Survey). According to Hatch (1892) and Roberts (1916) some nest in northern Minnesota, and there are records of breeding for North Dakota (Wood, 1923), but none available for Montana or Wyoming. Young have been taken on the Priest River, Idaho (U.S. Biological Survey) and in Washington (W. L. Dawson and Bowles, 1909; Dearborn, Streater, U.S. Biological Survey), but not in Oregon or California.

In southern Baffin Land both Kumlien (1879) and Hantzsch (1914) found this Merganser a moderately common nesting bird. On the west coast of Greenland it is a rather common nester from Augpalartok, just north of Upernavik, south to Julianehaab, while on the east coast it has been found nesting at Angmagsalik and Scoresby Sound (F. M. Chapman, 1899; Helms, 1904; Vanhöffen, 1897; Winge, 1899; etc.). Manniche (1910) reports seeing the species as far north as Renskaeret, King William's Land, on July 21.

In Iceland this Merganser nests commonly (Slater, 1901; Hantzsch, 1905; etc.). It breeds also on the Faroes (H. C. Müller, 1869) and on the Shetlands (Saxby, 1874; A. H. Evans and Buckley, 1899). In northern and western Scotland it nests commonly and has been so recorded from the Orkneys, Sutherland, Caithness, Ross, Inverness, Skye, Outer Hebrides, Inner Hebrides, Argyll, Dumbarton, Renfrew, Ayr, Bute and Wigtownshire. In the east, nests have been taken in Moray, Banff, Aberdeen, Perth (Baxter and Rintoul, 1922; W. Evans, 1922). In Ireland it nests commonly in the north and west, but not in the east and south (Ussher and Warren, 1900). As yet the species is not known to have nested in England or Wales.

On the Continent this Merganser has been recorded nesting as far south as Lakes Constance and Neuchâtel, Switzerland (Jäckel, 1891; Fatio, 1904), but these records almost certainly refer to the Goosander. On the other hand there is a reliable record of its nesting in 1916 off the island of Rottum, Holland (van Oort, 1916, 1922). In Germany it has been found nesting in Mecklenburg, on Rügen, in Pomerania, and in West and East Prussia (Naumann, 1896-1905; Hartert, 1892; Szielasko, 1895; Wüstnei, 1898). It is a common breeding bird in Denmark (Kjærbølling, 1850; Winge, 1890) and throughout Norway and Sweden (Wallengren, 1854; Nilsson, 1858; Collett, 1873; Schaanning, 1913; etc.), as well as throughout Lapland and Finland (Palmén, 1876; S. A. Davies, 1905; Suomalainen, 1908; Finnilä, 1913, 1914; Palmgren, 1913; Montell, 1917; etc.). It is a common nesting bird in Russian Lapland (Witherby, 1900; Bianchi, 1902b; H. J. Pearson, 1904) and about Archangel (Seeböhm, 1883). Smirnov (*vide* Schalow, 1905) met with it on Kolguev and von Heuglin as well as H. J. Pearson (1899) have recorded it from Waigats. On the lower Petchora it was not rare (Harvie-Brown, 1876). Sievers (1877) speaks of it as a very common breeding bird about Lakes Ladoga and Onega, but Bianchi (1907, 1910) says that while it nests commonly in Novgorod it does so rarely about Petrograd. In Esthonia and Latvia it is a common nester (Sawitzky, 1899; Buturlin, 1906a; Loudon, 1909). In eastern Russia the breeding range extends farther south, to the middle Volga and Ufa (Buturlin, in Dresser, 1908-09) and according to Moeschler (1853) even to Sarepta. Radde (1884) gives one breeding record for the Caucasus.

According to Nazarow (1887) this Merganser is a rare breeder on the Kirgis steppe. Our information regarding its status in this part of the world is very meager. Specimens have been taken at Tomsk in May (P. and J. Zalesski, 1915) and it occurs on the Jenesei from Jeneseisk to the delta (Popham, 1898; Suschkin, 1913). Zitkov (1912) has reported it from the Yal-mal peninsula. Farther east it is known to nest on the Wiljui (Maak, 1859) and Bunge (1883) saw flocks at the mouth of the Lena. In Transbaikalia it is a very common breeder (Radde, 1863) and the same is true of the lower Amur (von Schrenck, 1859; Dybowski, *vide* Taczanowski, 1893). It probably nests on Saghalin Island (Hesse, 1915) for it does so on the Kuriles (Stejneger, 1898) and probably on Kamchatka and about Gichiga and Marcova

Central  
States

Washington

Baffin Land  
GreenlandIceland  
Faroes  
Shetlands  
ScotlandSwitzerland  
Holland  
GermanyScandinavia  
Russia

Siberia

Saghalin  
Kamchatka



(Bianchi, 1909; J. A. Allen, 1905). It occurs about the mouth of the Kolyma and breeds (Buturlin, 1906b; Thayer and Bangs, 1914; Riley, 1918) and has been taken on the Anadyr in June (Bianchi, 1908). Nelson (1887) speaks of seeing it along the Asian coast from Plover Bay to Cape North. On Bering Island it is a common nester (Stejneger, 1885; Bianchi, 1909; Hartert, 1920a).

#### WINTER RANGE

ON the Pacific coast of North America the Red-breasted Merganser occurs in winter as far north as Aleutian Islands the Aleutians (L. M. Turner, 1886) and Pribilofs (Evermann, 1913). I find no record of its wintering anywhere in southeastern Alaska (which it certainly must do) or in fact Alaska north of southern British Columbia, where it is found on the coast plentifully and also at Okanagan Lake (A. Brooks; Munro, 1923). It is common on Puget Sound and the coasts of Washington (W. L. Dawson and Bowles, 1909; Rathbun, 1915) and Oregon (Pope, 1895-96; Woodcock, 1902). In California it is common along the whole coast (J. Grinnell, Bryant and Storer, 1918), the range extending south to the Cape region of Lower California (Brewster, 1902). In the Pacific specimens are sometimes taken on the Hawaiian Islands (R. C. L. Perkins, 1903). Scattering birds have been taken in the interior of western States, in Nevada (Hoffman, 1881), Colorado (W. L. Sclater, 1912) and in Arizona (Swarth, 1914), but it must be extremely rare in all this region. The Kennicott Duck Club records only one taken on its grounds in eastern Colorado in nineteen years' shooting (Bergtold, 1924).

In the Mississippi basin the species winters as far north as Minnesota (Hatch, 1892; Roberts, 1916) and Wisconsin (Kumlien and Hollister, 1903). It is not rare in Illinois about Lake States Michigan (Woodruff, 1907) or in southern Michigan (Barrows, 1912) and Indiana (A. W. Butler, 1898), though it is scarce in Ohio (L. Jones, 1903).

ON the Atlantic coast it is found in winter as far north as New Brunswick (Dresser, 1871-81) and Nova Scotia (Downs, 1888; Tufts, 1918) and at times in the Gulf of St. Lawrence (Anticosti). It is Atlantic common on the coasts of New England (G. M. Allen, 1909), especially south of Cape Coast Cod, and off Long Island (Braislin, 1907). It continues to be plentiful southward along the coasts of New Jersey (W. Stone, 1909), Delaware (Rhoads and Pennock, 1905), Maryland (Kirkwood, 1895), Virginia (Rives, 1890) and the Carolinas (T. G. Pearson, C. S. and H. H. Brimley, 1919; Wayne, 1910). It is common enough on both coasts of Florida (Scott, 1888; etc.) but rare about the southern parts (U.S. Biological Survey). It is known to have straggled once to the Bermudas (S. G. Reid, 1884) and once to Havana, Cuba (Barbour, 1923).

ON the Gulf coast it is common along the seaboard of Alabama (Howell, U.S. Biological Survey) and Mississippi (Corrington, 1922) as well as in Louisiana (Kopman, 1921). It is not uncommon on the coasts of Texas (Strecker, 1912).

Considerable numbers of these birds winter in southern Greenland (Winge, 1899) and in Iceland Greenland (Hantzsch, 1905), as well as on the Faroes (H. C. Müller, 1869) and Shetlands (Saxby, 1874; A. H. Evans and Buckley, 1899). It is common on all the coasts of Great Britain British Isles and Ireland (Dresser, 1871-81; Millais, 1913; Ussher and Warren, 1900; Witherby *et al.*, 1919-22; etc.).

ON the Continent some winter as far north as Varanger Fjord (Collett, in Dresser, 1871-81), but Western regularly south only of the Arctic Circle (Schaanning, 1913). It appears to be rarer on Europe the Baltic coasts, though a few winter about the Åland Islands (Palmén, 1876). It is exceedingly rare in the interior of Poland (Katin, 1912; Hammling, 1917) and Germany (Jäckel, 1891; R. Blasius, 1896; Le Roi, 1906-07; Kollibay, 1906; etc.) but on the coasts of Denmark it is common (Kjærbølling, 1850; Wallengren, 1893). The same is true of the coasts of Holland (van Oort, 1922) and Belgium (Dubois, 1886), but on the north coast of France it is not very plentiful (Paris, 1907; Ternier and Masse, 1907). It is rare on the north coast of Spain (Aldaz y Amazabel, 1918), but is moderately



abundant on the Portuguese seaboard. It is known to have straggled to the Azores (Hartert and Ogilvie-Grant, 1905) and to Madeira (Schmitz, 1907a). In some years it is plentiful in the Straits of Gibraltar (Irby, 1875) and it is also recorded for Minorca (Munn, 1924). It is known to occur occasionally in Algeria (Loche, 1867; von Erlanger, 1900) and Tunis (J. I. S. Whitaker, 1905; Millet-Horsin, 1912). On the east coast of Spain it has been taken in winter at Malaga, Valencia and in Gerona, as well as on the Balearics (H. Saunders, 1871; Reyes y Prosper, 1886; Arévalo y Baca, 1887).

It occurs regularly but not commonly on the coasts of Provence (l'Hermitte, 1916) and occasionally in Corsica (J. Whitehead, 1885; Jourdain, 1912) and Sardinia (Salvadori, 1865; Brooke, 1873). It is said to be moderately common on the Swiss Lakes (Fatio, 1904) and in northern Italy, though it is very rare in southern Italy and Sicily (Salvadori, 1886; Giglioli, 1886, 1889-91; Arrigoni degli Oddi, 1904). In Malta, on the other hand, it is quite common in some years (C. A. Wright, 1864; Despott, 1917). As in North America, so in Europe, specimens are taken in the interior on rare occasions. Beyond those taken in Germany one might mention others taken in the Tyrol (Althammer, 1857), Styria (Hanf, 1887), Moravia (von Tschusi zu Schmidhoffen, 1913), Bohemia (Fritsch, 1872; von Tschusi zu Schmidhoffen, 1911), and Transylvania (Danford and Harvie-Brown, 1875).

On the Dalmatian coast this bird is not rare (Kolombatović, 1903), and the same is true of Albania and western Greece, though in the rest of Greece it is very scarce (von der Mühle, 1844; Lindermayer, 1860; Powys, 1860; Reiser, 1905). Gengler (1920) reports a specimen from the Sea of Marmora and Elwes and Buckley (1870) speak of it as not uncommon on the coasts of Turkey. Tristram (1884) found it common on the coasts of Palestine and Wyatt (1870) met with it in Sinai. Von Heuglin (1873) states that the Leiden Museum has a specimen taken in Egypt.

This species is not common on the coasts of the Black Sea, either in Bulgaria (Radakoff, 1879; Alléon, 1886) or in the governments of southern Russia (Radde, 1854; Dresser, 1871-81; Brauner, 1894; Valkh, 1911; Kennedy, 1921). Seebohm (1882) says it is rare about Astrakhan and Radde (1884) says the same of the Caucasus. Small numbers winter in Persia (Zarudny, 1911) and specimens have been taken in Baluchistan and in India at the Calcutta Market (Baker, 1921).

On the southern and southeastern coasts of China the species is common (La Touche, 1892; Vaughan and Jones, 1913), but it is reported as rare on the Yangtse (Styan, 1891), though it has been taken in winter as far north as Kiau-chow (Kleinschmidt, 1913), Peking (David and Oustalet, 1877) and even Korea (Taczanowski, 1893). Off the coast the species winters as far south as Formosa (R. Swinhoe, 1863; Uchida, 1912), presumably on the Liu-kiu Islands, and in Japan from the southern parts north to Hakodadi (Seebohm, 1890; Kuroda, *in litt.*). I do not know whether it winters on the Kuriles but a few do so on Bering Island (Stejneger, 1885; Bianchi, 1909).

#### MIGRATION

It is probable that almost everywhere near the ocean these Mergansers gather on coastal waters before any great southward movement takes place. Others doubtless migrate across country in various directions, but as little or no banding has been done, we know nothing about these inland routes. Migration on our Atlantic coast is a very well-marked affair and it is much earlier than the movement of the American or the Hooded Mergansers. At Cohasset, Massachusetts, the Clark shooting records (B. P. Clark, MS.) covering a very long period (thirty-five years or more) show that the average first appearance is October 3, but the average of the main flight is between October 15 and 25. The earliest appearance ever noted was on September 20, 1883, and in about half the years the first birds appeared during the last week of September. But the remainder of the years they arrived between October 1 and 11 and once (1871) they were not noted until October 30. In the Washington, D.C., region the average first arrival is October 29 and the earliest October 23 (M. T. Cooke, 1921).



There are various waves of migration during November and December, indeed there are irregular movements all winter, depending no doubt a good deal on the severity of the weather. The great preponderance of birds in immature plumages during the early flights in Massachusetts and the large proportion of males during mid-winter is a common observation and need not be discussed (see Bent, 1923; C. W. Townsend, 1911).

Besides this there is a corresponding abundance of young birds in southern coastal waters along the Carolinas and Florida during winter. The sudden appearance of adult males noted by Wayne (1910) in South Carolina is indeed remarkable. May not these be immatures coming into their mature plumages?

In California some have been known to arrive as early as October 9 (Cooke, 1906). They leave their summer quarters in the far Northwest during early October and are gone from all interior northern regions by the middle of the month.

The autumn migration in western Europe is not so marked an affair as it is with us. In favorable regions there seems to be little more than a movement to the sea-coast, with a secondary southward extension of range by the immatures. This depends, too, a good deal on the severity of the winter, abundance of food and doubtless other factors not known. They may not appear in southern Europe until very late in the autumn.

The different dispersal of the sexes in winter appears to be as well marked in western Europe and the Mediterranean countries as it is with us (Millais, 1913; Alléon, 1886; Loche, 1867; Radde, 1854; Picchi, 1904).

Spring migration is characteristically late (at least as compared with that of the Goosander) and extends through April well into middle, or even late May. There is a much earlier migration in New England in March, although as a rule not such a large affair as the late one. During summer a few stragglers (non-breeders or cripples) may be found almost anywhere along our coast, from New England to as far south as North Carolina (Pamlico Sound), possibly even farther. Cooke (1906) gave the average date of first arrival at Montreal as April 16 (earliest April 6, 1894); North River, Prince Edward Island, April 21 (earliest April 15, 1891); Lake Mistassini, Quebec, May 11, 1895; Heron Lake, Minnesota, April 2, 1884, April 4, 1885; and extreme northwestern points from late April to middle May.

An adult female, B. B. 521, marked on her nest in County Fermanagh, Ireland, was recovered near the same place nearly three years later. A young bird marked as young in northern Germany was recovered in the autumn of the following year at Gratz, Austria (Thienemann, 1916, p. 534).

### GENERAL HABITS

THIS, by far the most familiar and abundant of all the Mergansers, is in many of its traits and habits rather distinct from the Goosander; in fact there is probably little in the way of really close relationship.

Wrongly termed "Sheldrake" all along our Atlantic coast, this is a salt-water bird, although on migration it may be found almost anywhere, especially in large lakes, where a few even winter. In summer it spreads inland to breed, but the vast majority proceed to fresh water near the coast or even to sea islands. The plains regions, with their shallow, muddy waters often impregnated by alkali salts, are never chosen, so that a great interior region of our continent should really (except in rare nestings) be left entirely out of the breeding range. It is doubtful whether there is any interchange between western- and eastern-bred individuals, but only banding can decide this question with certainty.



WARINESS. Almost everywhere classed as a shy and intelligent bird, and one extremely difficult to approach under sail or with a sculling craft in open water, it cannot in my opinion be put in the same class with the Golden-eye. I rather doubt, too, whether it is so wary a bird as the Goosander, although its habits and distribution make it harder to get at. European sportsmen have spoken of the difficulty of approaching these Mergansers with an English punt (A. Chapman, 1889; etc.), but I have several times sculled to and shot young birds in autumn from one of our Ipswich "gunning floats" without difficulty. Of course in almost every species one occasionally runs across foolish or "dumb" individuals, even whole flocks that are unsophisticated. They never, as Payne-Gallwey observed, dispose themselves to rest in the comfortable positions that most ducks assume, but are always restless, active and vigilant.

Red-breasted Mergansers do not show any acuteness in avoiding wooden decoys, and being very gregarious by nature they come to the crudest sort of wooden imitations better than other sea-fowl, Scoters excepted.

DAILY MOVEMENTS. These are well marked and regular on the wintering grounds. Because they are essentially day-feeders they appear at the first light of morning and proceed from larger bays or the open sea to their regular feeding grounds in shoal water off beaches, far up estuaries and even into narrow tidal creeks if they are not much disturbed. Their movements depend also upon the state of the tide, and they like to drift up toward the heads of inlets with the flooding tide, or perhaps fly up on the flood and gradually work back on the ebb. Other waters are more suitable at half tide or low tide so that they are continually "on the go." They seldom cross beaches or points in morning and evening flight, but often come near land. In unusual weather they are apt to flight inland a short distance, searching for some stretches of sheltered fresh or brackish water. Even in such places as Pamlico Sound, North Carolina, where they find such broad waters that they do not have to go to sea at night, they still exhibit a period of active fighting early in the morning, "trading" from some night haunt to a day haunt.

GAIT, SWIMMING, DIVING. The gait and the swimming position are the same as in the Goosander. The species looks to be (and it is) more delicately proportioned and smaller. They can run for a good distance over smooth sand and they often do this before taking to wing.

I do not think this Merganser comes out of water and walks about on the edges of the ice or on lake shores nearly as often in winter and spring as the Goosander does. In fact, in a lake it is noticeable that this bird stays more in the open water and does not trust itself close to land. As to picking out the female of the present species from among female Goosanders on the water with the aid of a glass, I can well believe that



this is possible with especially keen observers who have seen much of both kinds, but I think a snap identification by the casual observer must be worse than useless. The characteristically whiter throat of the Goosander may identify a large proportion in good light at short ranges, but this is not a very prominent field-mark and is subject to a good deal of variation. The Red-breasted Merganser has a much paler reddish head, but some Goosanders have pale heads, whereas others have the head very brightly and richly colored. The larger crest and bluer back of the female Goosander is not often apparent, while the small crest of the Red-breast may appear larger than it is, through being blown about in the wind.

This Merganser dives in two ways: with the preliminary leap and the quieter submergence. As a rule it pursues fish in various directions but I have never observed a concerted flock action in driving a shoal of fish or surrounding it. Of course one flock of birds will pursue a given shoal of fish, but I doubt whether it is necessary for them to use any "team work" in capturing their prey. Although a great deal of the food is of course captured without their going to the bottom, I have watched birds which, from their constant position and regular dives in water not over ten or fifteen feet deep, seemed to be feeding largely on bottom. These birds stayed under from twenty to twenty-five seconds and averaged twenty-two seconds, while above water they remained only from fifteen to twenty seconds. Dewar (1924) timed his longest at forty-five seconds and the greatest depth at eighteen feet. Other writers have timed the usual dive at fifteen seconds (Haigh, in Cordeaux, 1896) and I do not think Mergansers ever make really long stays under water. They sometimes fish in shallow water without diving, merely swimming along with head immersed as do other Mergansers. There is reason to suppose that the adults are apt to feed in deeper water than the birds of the year and the adult males in deeper water than the females (Dewar, 1924).

In following fish the legs are used almost exclusively, and some observers say that the wings are *never* opened under water. Others (Vaughan and Jones, 1913) in watching one feeding from a very favorable position saw it open its wings twice in the course of half an hour. With wounded birds both wings and feet are used. The various writers who claim that the wings and feet are used equally under water are certainly misinformed. There is another method of fishing, which consists in flapping along the surface, with only the wings and head submerged, a performance which I do not remember ever to have seen.

**FLIGHT.** The Red-breasted Merganser runs along the water preparatory to flight just as the other Mergansers do, and seems no better able to rise quickly. The young have the peculiar faculty very highly developed of running, or "skittering" along the surface in an almost upright position. Living as they do at an early age in waters little protected by thick vegetation, this performance gives them a telling means of



rapid escape to a distant point of safety. It also allows them a rapid means of progression which can be used at any time in the long interval between the downy stage and flight, for Mergansers are extremely late in growing their primaries.

The flight is accompanied by only a slight whistling or rustling sound, and is very direct and close to the water. Long lines or wedges are commonly seen and in migration the individuals are often well extended in arrow-shaped or goose-like formations.

The packing of huge aggregations of young birds in late summer and autumn, usually with only one old female as guardian (but sometimes without any old ones) is very characteristic and has been noticed by several writers. I have certainly seen thirty or forty young of this or the American Goosander (probably both) on our northern rivers, rushing down ahead of my canoe for miles, before they could find a place where they could hide so as to allow the canoe to pass them, when they would rush back up-stream in the same extraordinary manner. Large packs, even up to one hundred, have been seen in Ireland in August (H. Trevelyan, in Millais, 1913).

Aside from the packing habit of the "flappers," very large flocks are unusual in the autumn on migration, and although I have no particular notes on this point, I should say that most flocks were under fifty and many only of a dozen or two. On their return in the spring, however, they band together in a good deal larger aggregations, as many other sea ducks do, and then great flights can be seen along our New England coast.

On the water great masses are seen gathered at favorable places. Dr. C. W. Townsend has seen 25,000 at one time off Ipswich Beach in October and in Irish waters a thousand have been seen together in winter (Payne-Gallwey).

**ASSOCIATION WITH OTHER SPECIES.** This is an extremely gregarious fowl and therefore a good many other sea ducks are apt to be found at one time or another mingled with their ranks, particularly Scoters, Long-tailed Ducks and Golden-eyes. The young of this and the Goosander often become more or less mixed in our northern rivers and the adults of the two species are sometimes found mixed in winter. I have seen a flock of sixty or seventy birds, about two-thirds of them Goosanders, living in a small open sheet of fresh water near the sea on a protected area within the city of Boston, Massachusetts. On the breeding grounds there is, so far as I know, never any mixing of eggs with those of other Mergansers, but in Iceland they are said to nest in the same places as the Barrow's Golden-eye (Shepard, in Baird, Brewer and Ridgway, 1884) and once a female was found sitting on four eggs of the Golden-eye besides her own! Leverkühn (1891, p. 121) cites several cases of eggs deposited in holes and mixed with the eggs of the European Sheldrake (*Tadorna*). One egg of the Ancient Murrelet (*Synthleboramphus antiquus*) was found in a Merganser's nest in Alaska (Bendire, 1895).



VOICE. The voice of the male, heard so far as I know only in the season of courtship, is characterized by C. W. Townsend (1911) as a loud, rough and purring, slightly double note, which he recorded in his note-book as like *da-ah*; but he adds that it is insusceptible of expression by means of syllables.

The female's voice, which is not heard very much except on the breeding grounds, when she is followed by young, is a rough croaking noise, not quite a *quack*, but sometimes approaching one. This female note is also heard in display and occasionally when a flock is flying by on the wing.

The trachea as described by Audubon and well figured by Yarrell, is eleven and a half inches long (290 mm.) and has a large dilatation two inches in length above its middle, besides a lesser enlargement lower down. At its lower end is a very large, irregular and curious-looking *bullæ ossea* which is two inches in its greatest diameter. The structure is so complicated as to defy an adequate short description.

FOOD. In a general way the diet of the Red-breasted Merganser resembles that of the Goosander, though the fish taken are usually smaller. In addition to fish, crustaceans, water insects and even earthworms are occasionally taken, probably chiefly in summer. There seems to be no kind of small fish that they will not take, and trout, salmon, sand-smelt, blenny, roach, gudgeon, plaice, dace, pike, coal-fish, parr, rock bass, spotted shark, hake, pipe-fish, sprat and whiting have all been found in stomachs. Nevertheless they seem, if one may judge by the literature, to have a particular partiality for eels and sticklebacks. Nelson (1887) said that in Alaska they feed very largely on stickleback and Hantzsch (1905) found similar fish in the stomachs of very small ducklings in Iceland. In Scotland they feed to a large extent on black eels (G. R. Gray, 1871) and the same appears to be true of Ireland (W. Thompson, 1851) and England (Cordeaux, 1896).

Like the Goosander, the Red-breasted Merganser is a notorious glutton, and almost incredible quantities of food have been found in some stomachs. Linton (1908) speaks of a specimen taken at Santa Cruz Island, California, in January, which contained nine rock bass and one spotted shark, each two to four inches in length. Lee (1896-97) says he once took eleven good-sized parr from a stomach, while W. Thompson (1851) reports one which was gorged to the mouth with sand-eels, twenty-four in number, and Cordeaux (1896) speaks of a bird in which twenty-three sprats, three inches in length, and one whiting were found.

The Red-breasted Merganser probably takes crustaceans somewhat more commonly than the Goosander does. H. W. Robinson (1909a) reports finding in one crop from a November-shot bird a small crab, and in the gizzard two more crabs besides two or three claws, one of a much larger crab. There was no trace of fish, though the bird had been feeding on banks where coal-fish fry were swarming. Haigh (quoted by Cordeaux, 1896) also remarks that small crabs are swallowed whole, while in the



case of large crabs the claws are first broken off. In Florida, Scott (1888) noted that these birds particularly frequented the oyster bars.

In the summer the food is probably quite different. Hartert (in Naumann, 1896-1905) said that while in winter he had never found anything but fish in the stomachs, he had in East Prussia in summer found insects, including cockchafers, larvæ of dragon-fly, and caterpillars as well as earthworms.

In feeding habits it closely resembles its relative, the Goosander. The individual bird may often be seen swimming with the bill in the water and the head submerged as far as the eyes. Saxby (1874) says that when, at such times, they sight a fish they will dive immediately, not stopping to take air. "After swallowing a fish, which is always first brought to the surface, the bird raises the fore part of its body, flaps its wings, and then takes a drink of salt water, raising its bill like a common fowl." I might here add that in my experience great numbers, probably most, of the smaller objects are swallowed as caught and I think it is unusual to see food brought to the surface. Good observers, however, have seen them on the surface with fishes in their bills and have seen the lucky one chased by other members of the flock.

Flocks frequently feed together, and while the stories of fixed formations are probably exaggerated, they do launch their attack in unison and cause considerable havoc. Elliot (1898) says he has seen the gulls take advantage of the commotion to seize the fish stirred up by a company of Mergansers.

**COURTSHIP AND NESTING.** The rather awkward and bizarre display of mating birds may be seen any warm day from late February on until April or May, but best in March and April. Sometimes, but very rarely, it may be seen in autumn, but it is rare then to see adult couples together, or adult males in anything like perfect feather. The display itself was well described by C. W. Townsend (1911): the drake begins by stretching up his long neck so that the white ring is much broadened, and the metallic green head, with its long crest and its narrow red bill, makes a conspicuous object. At once the bill is opened wide and the whole bird stiffly bobs or teters as if on a pivot, in such a way that the breast and the lower part of the neck are immersed, while the tail and posterior part of the body swing upward. This motion brings the neck and head from a vertical position to an angle of forty-five degrees. All the motions are stiffly executed, and suggest a formal but ungraceful courtesy.

The male's voice has been described, and the bobbing of the head and the love-note may be given twice in rapid succession, although at times the performance is a single one, or may consist of an extensive bob, preceded by a slighter, but similar one. The bobbing-up of the stern of the male is accompanied at times by an arching upward of the wings so that the white secondary feathers are very prominent. This whole performance is interesting chiefly because it is so absolutely different from what we see in the Goosander.



The breeding season is consistently later than that of the Goosander. On the Anderson River, R. MacFarlane (1908) found eggs on July 4 and on Reindeer Lake, A. Buchanan (1920) found eggs on July 12, but in the more temperate regions the season is usually in late May or early June. In Wisconsin eggs were taken about June 20 (Strong, 1912). On the Magdalen Islands many clutches were found between June 17 and 26 (Bishop, 1889; Bent, 1923), while in Labrador records of eggs extend from June 4 to July 16 (Bent, 1923). Kumlien (1879) says that in the region of Cumberland Sound, Baffin Land, the breeding season is about July 1.

We have no specific data regarding the nesting time in Greenland, but in Iceland the eggs are laid about the middle of June (Faber, 1822; Hantzsch, 1905), and in Scotland and Ireland no eggs are found before the end of May, most of them being laid in June (Ussher and Warren, 1900; H. Noble, 1908; Millais, 1913). Wüstnei (1898) reports eggs taken in Mecklenburg on June 20, and Szielasko (1895) says that in East Prussia he found no eggs before June 22, though Hartert (in Naumann, 1896-1905) states that they are laid there from the end of May to the middle of June. In Finland the first eggs were found by S. A. Davies (1905) on June 5, and it seems that the bulk are not laid till the second half of June (A. Newton, 1907).

The nest is, I believe, always placed on the ground, usually on small islands in fresh-water lakes and more rarely near the sea. It is common to find small numbers, about six to ten, nesting in close proximity to each other (Hantzsch, 1905; and others). The nest itself is ordinarily near the water and preferably under some kind of cover, beach trash, old logs and roots. In Scandinavia and other places the drooping branches of spruce trees are often taken advantage of while in Scotland the nest is often found in the scrub, under exposed roots of trees, under overhanging rocks and even in rabbit burrows (G. R. Gray, 1871; Saxby, 1874; H. Noble, 1908; etc.). In Iceland sheltered holes in clefts of lava are commonly chosen (Hantzsch, 1905). In America the nests are in no way different, and may often be found in the piles of driftwood not far from the water. Several writers speak of finding a path through the scrub to the well-concealed nest, but Audubon asserts that he has never seen any such clue to the whereabouts of the eggs.

The clutch varies from six or seven to ten or twelve, the average being about nine (Strong, 1912). As many as sixteen have been found in one nest (Collier, 1904), but this may have been the work of two females. The eggs vary in color from olive buff to grayish buff and occasionally have a pronounced greenish tinge. The measurements of eighty-five eggs in the United States National Museum average 64.5 by 45 mm., the extreme lengths being 67.5 and 56.5 mm., the extreme breadths 46.5 and 41 mm. (Bent, 1923). The measurements of a hundred eggs (probably all European) mentioned by Hartert (1920a) average 65.25 by 44.66, the extreme lengths being 70.7 and 60.4, the extreme breadths 47.3 and 40.3 mm. The nest-down is much darker than that of the Goosander. Bent (1923) described it as "mouse gray" with paler centers.



The incubation period, according to an old list of Tiedemann's (*fide* W. Evans, 1891) is twenty-six to twenty-eight days. No other careful observations have been made in the field, but Strong (1912) found that fresh eggs placed under a hen took just short of twenty-nine days to hatch. During the incubation period the males entirely disappear and do not rejoin the family. The female is a very close sitter and on occasion will almost allow herself to be stepped on before leaving the nest. But once the young are hatched she shows less solicitude. It is a characteristic of this species that the parent often deserts the young, many of whom perish (Hantzsch, 1905) while the rest flock together under the leadership of one or two more maternally inclined elders. In Ireland such aggregations of young numbering hundreds have been seen (Trevelyan, London Field, September 3, 1910 and October 21, 1911). Of course there are instances on record of the female defending her brood with desperation, but C. W. Townsend (in Bent, 1923) is certainly wrong in saying "both parents are assiduous in caring for the young. The young Mergansers are carefully fed and guarded by their parents and the family group keeps together until the young are fully grown." Nor is the pretty picture described by Rev. Manly B. Townsend (in Bent, 1923) where the young brood was led by a "wary old male in full plumage" either characteristic or accurate. Males are not in full plumage at this season, nor do they accompany their broods except by sheer accident.

The young can apparently dive for food at an early age but no doubt a great deal of their food is taken at or near the surface. We do not know how much food is supplied them by the mother, but I think it doubtful whether the maternal feeding lasts long, for it is common to see broods only two or three weeks old very much split up and apparently shifting for themselves. More observations on early attempts to catch fish would be interesting. Much has been written of their preference for the "skittering" method of escape over diving, and this is certainly characteristic. Where the young Golden-eye only a few days old will escape by diving after the initial rush over the water, the young Merganser will keep to the surface, though you chase him for mile after mile.

Cory (1878) tells of seeing one weakling climb upon the mother's back, and both Ussher and Warren (1900) and Strong (1912) report young Mergansers in confinement climbing upon the backs of their hen foster-mothers. Strong found that young ones could not stand on their feet for some time, but that they could move over the ground rapidly with a peculiar wriggling movement suggestive of a snake.

STATUS. Everywhere abundant, and showing little decrease in numbers due to advancing civilization, this Merganser, on account of its far-northern breeding area, wary nature and coarse flesh, needs little protection. There is no doubt that it has increased with us on the North Atlantic coast in the past ten years, due to immunity during its spring passage. It used to be shot heavily in March and April,



mostly because it offered very pretty shooting at that season, coming gracefully to decoys anchored off some point or island. However, the taste for shooting birds unfit for food is happily dying out and our herons and other large birds would now be fairly safe if it were not for the increase in foreign populations who are inclined to flavor the pot with any sort of wild meat, nice or nasty, legal or illegal.

It will be some time before the summer home of this Merganser will be seriously interfered with, although the advance of lumbering operations, damming of rivers and destruction of river fish will most likely interfere with nesting all over our northern States. The only thing, as I see it, that may reduce them on either of our coasts is the oil nuisance, which we hope may soon be controlled.

Recent writers on western Europe do not speak of any decrease. It is the commonest breeding duck in many northern regions and in Scandinavia far exceeds the Goosander. An increase has been noted in some parts of Ireland and Scotland, and rewards for its destruction have been found necessary on trout and salmon rivers.

ENEMIES. The larger birds of prey rarely attack Mergansers, on account of their habit of flying close above the water, but gulls evidently cause a good deal of destruction among the eggs and the young. Collier (1904) tells of seeing a Greater Black-backed Gull wear out a brood and then pick two of them off the water on one of the Inner Hebrides, and G. R. Gray (1871) says he has watched Lesser Black-backed Gulls destroy the eggs. The nests, however, are usually well hidden and placed in thickets where they are little disturbed by gull robbers.

The Merganser occasionally falls a prey to the larger predatory fish, and Dr. H. B. Bigelow tells me that there are various records of these and other sea-fowl being found in the stomachs of goose-fish (*Lophius*). They seem also to be especially victimized by parasitic creatures. In Iceland Hantzsch (1905) examined a number of the ducklings that he found dead and discovered that the nostrils were full of leeches filled with blood. T. E. Gunn (1869) reports a specimen with thirty small worms in the intestine and Mr. Francis Harper (MS.) shot one on Lake Athabasca that contained six flatworms. Naumann gives a long list of parasitic worms that have been found by special investigators.

DAMAGE. It is very difficult to estimate the damage to fish caused by the Merganser, but I am inclined to think that it is less extensive bird for bird than that due to the Goosander. The Red-breasted is, to be sure, by far the commoner species in most temperate countries, but it is a smaller bird, and, as already remarked, is more likely to feed on smaller fish besides other animals. Then, too, it is less of a fresh-water bird and feeds during a great part of the year on the economically worthless small fry found along the sea-coast.



**FOOD VALUE.** There is little appreciable difference between the Merganser and the Goosander as far as edible quality is concerned. The young in the autumn are often considered palatable up to October (Stearns, 1890; Millais, 1913; Willett, 1914), but, after reaching the sea, they are hopeless. Nevertheless the Aleuts are said to prefer them to any other duck (L. M. Turner, 1886) and the eggs, like those of the Goosander, are much appreciated in some places (Hartert, in Naumann, 1896-1905; S. A. Davies, 1905).

**HUNT.** In New England "sheldraking" was, not so long ago, a well-recognized sport, especially on Cape Cod, Massachusetts. The men who shot for the market got most of their Black Ducks at night and they had plenty of time on their hands during day-light hours to shoot Mergansers, tend their eel-pots or dredge for sea-clams. Nearly all the people a generation ago were very fond of Scoters, Mergansers and any other sea-fowl, but the taste for these strong meats is undoubtedly slowly dying out.

The really large bags were made mostly on the spring flight but sometimes in winter when ice blocked off a huge part of the feeding grounds good shooting was to be had in air-holes or creeks where the tide kept the water open. The "Cape Coder" usually owned a string of a dozen or so home-made wooden decoys, sometimes ornamented with pendent horse-hair crests and these he could carry over his shoulder, or keep stowed away all winter in the stern of his dory. Large bags were occasionally made in the spring, thirty or forty not being uncommon and the booming of guns could be heard every morning up into the second week of May. I once asked a native son, who went by the resounding title of George Washington Rogers, what he did with an especially large kill of Sheldrakes which he had recently made. In reply he told me that he "just buried them round the fruit trees."

The difficulty of shooting them from a punt has been mentioned before and it is a fact that were it not for their gregarious nature they would be a very hard bird to kill.

**BEHAVIOR IN CAPTIVITY.** The Red-breasted Merganser has never been successfully kept in confinement for any length of time, though the larger zoölogical gardens occasionally keep it as long as they can, and it was included in the water-fowl collection of Louis XIV at Versailles (Loisel, 1912). The records of the London Gardens show that three specimens lived only seven months on the average, the longest being a year and a half (P. C. Mitchell, 1911).

The only observations available are those made by naturalists who, from time to time, attempt to rear the young after hatching the eggs under a hen. By far the most detailed notes of this kind which I have run across, were made by Strong (1912), in Door County, Wisconsin. He tried to rear three young which had been hatched out



by a hen. Attempts to force boiled egg and liver proved unsuccessful but the one which survived took to eating grasshoppers, especially when offered by the hen. When a few days old it ate eight grasshoppers, averaging over an inch in length, at a single meal, and when a week old the duckling showed great skill in darting after its escaping prey. It had some difficulty in manipulating the insects, but at the age of two weeks was sufficiently adept to eat thirty of them. In the third week some bits of cooked fish were eaten. The young bird did well and was moved to Chicago, a thirty-hours' railway ride, without suffering any ill effects, but it died soon after when separated from its foster mother.

**HYBRIDS.** No hybrids with this species have been recorded, so far as I know.



# CHINESE MERGANSER

*MERGUS SQUAMATUS* GOULD

(Plate 99)

## SYNONYMY

*Mergus squamatus* Gould, Proc. Zool. Soc. London, 1864, p. 184.

*Merganser squamatus* Salvadori, Cat. Birds British Mus., vol. 27, p. 478, 1895.

## VERNACULAR NAMES

*English*: Chinese Merganser, Gould's Merganser.

*German*: Chinesischer Gänsesäger.

*French*: Harle de Chine.

## DESCRIPTION

**ADULT MALE**: This very distinct and beautiful species most nearly resembles the common Red-breasted Merganser. The principal differences are as follows: black of head extending farther down on to neck and connected directly with the black mantle by a wide black band. On the under side of the neck a small band of white runs up from the upper breast. There is no trace of the rusty pink breast-band, all the lower parts being pure white or more probably in life salmon-cream color. The crest is long and double, exactly as in the common Red-breasted Merganser. Mantle and scapulars as in the latter species but back and rump are entirely different, the white feathers being conspicuously edged with black and having dark shaft areas and an intermediate black bar following the contour of the feather. Tail-coverts and tail about as in the common species. There is no tuft of ornamental white and black feathers at the sides of the breast, this region being pure white, and the white of the breast comes up much higher upon the sides of the mantle.

The sides and flanks of the present species have ornamental feathers, but instead of the vermiculations in the common species there is a striking crescentic pattern corresponding to that seen on the feathers of the back and rump. The wing has very nearly the same pattern as in the Red-breasted Merganser, but the marginal wing-coverts are much grayer and have a greater intermixture of white among them.

Iris brown to light brown (according to Buturlin gray in summer). Bill dull crimson, dark gray along top of culmen. Legs and feet coral-red to deep orange (W. R. Zappey, field-notes).

Wing 250–265 mm.; bill 52–57; tarsus 46.

**ADULT FEMALE**: Very closely resembles in coloration the female of the Goosander but is somewhat whiter on the upper breast and the sides of the breast.

Iris light brown. Bill dull crimson. Legs and feet orange to deep orange (W. R. Zappey).

Wing 240–245 mm.; bill 43–48; tarsus 44–46.

**IMMATURE MALE** (western Szechuan, December 8, W. R. Zappey, collector): Like the adult female, but the crest is longer and fuller and the whole head and upper neck much paler, sandy brown rather than chestnut-rufous. All along the sides of the breast, sides and flanks are ornamental barred feathers, gray and white but not clear-cut black and white like the feathers of the adult male. The



back and rump are very different from those of the adult female, being gray, irregularly barred and speckled with white. The same pattern is carried down upon the rump and upper tail-coverts. It thus appears that the immature male is very different from the immature female, and it seems possible that, unlike the Red-breasted Merganser and the Goosander, the juvenal male may be quite distinct from the juvenal female. Material, however, is lacking to clear up this point.

ADULT MALE IN ECLIPSE: What appears to be a late eclipse stage was described by Buturlin (1911).

DOWNY YOUNG: Not described.

### DISTRIBUTION

SPECIMENS of this rare bird have been taken as follows: the type from China with no date and no locality (J. Gould, 1864); a pair taken December 9, 1898, at Chien-yang in southwestern Hunan (Ogilvie-Grant, 1900a); one (or more?) taken near Lung-ling in western Yunnan (no date), where the species is common (H. R. Davies, 1901); one taken at Garmakhta in the Chabarovsk district of the Amur Province, eastern Siberia, on August 13, 1910 (Buturlin, 1911); six taken at Ichang, Hupeh Province, and at Yachow, Kiating and Kunyahsien, Szechuan Province, in November and December, 1908 (Thayer and Bangs, 1912); two collected in December, 1908, in central Fukien and one from the same locality, February, 1911 (La Touche, 1913); one taken on Copper Island (Commander group on June 9, 1911 (Hartert, 1920); one taken in Kwei-chow or Yunnan, without date or locality (Berlioz, 1921); five lately sent to the U.S. National Museum by Rev. D. C. Graham from the Ya River, Kiating, where they were taken in November, February, and March; and finally a single specimen taken in the Shanghai district in the early winter of 1924 (Sowerby, 1925). Sowerby also mentions one from Fukien, China, in the Museum of the Royal Asiatic Society, Shanghai.

These data lead one to infer, as Hartert (1920) points out, that the species breeds in northeastern Siberia and migrates to China to spend the winter.

### GENERAL HABITS

NOTHING specific recorded.





CHINESE MERGANSER

Male

Female









MAP 117. Distribution of Chinese Merganser (*Mergus squamatus*)

Locality records indicated by crosses (X)







# AUCKLAND ISLANDS MERGANSER

*MERGUS AUSTRALIS* HOMBRON AND JACQUINOT

(Plate 100)

## SYNONYMY

*Mergus australis* Hombron and Jacquinot, Ann. des Sci. Nat., Zool., ser. 2, vol. 16, p. 320, 1841.

*Nesonetta aucklandica* G. R. Gray (in part), Genera Birds, vol. 3, p. 627, 1844.

*Merganser australis* Salvadori, Cat. Birds British Mus., vol. 27, p. 484, 1895.

*Promergus australis* Mathews and Iredale, Ibis, ser. 10, vol. 1, p. 410, 1913.

## VERNACULAR NAMES

*English:* Auckland Islands Merganser, Southern Merganser.

*German:* Auckländischer Gänsesäger.

*French:* Harle australe.

## DESCRIPTION

**ADULT MALE AND FEMALE:** As nearly as I could make out after examining the small series of specimens in the British Museum and the Tring Museum, the sexes are alike except in size. Head and neck very dark brown except the chin and throat which are lighter. Mantle, scapulars, back, rump and tail very dark bluish black. Breast dull gray with a few lighter crescentic markings. Rest of lower surface mixed gray and white, except the flanks which are uniform dark blue-gray. Wing-coverts slate-gray like the sides of the breast, but the lower row is darker and carries a white band. The middle secondaries are white on the outer web and blackish on the inner web and tip. The primaries are black like the tertials.

Iris dark brown. Culmen and tip of lower mandible black; cutting edge of upper mandible and rest of lower mandible yellowish orange. Legs and feet orange; webs, joints and soles dusky (Captain Hutton). The soft parts of the female appear to be exactly the same as far as the small number of specimens indicates.

Wing of males 191–193 mm.; of females 176–179. Culmen, males, 60–61 mm.; females, 53–54. Tarsus, males, 42–43 mm.; females, 40–42.

**IMMATURE BIRDS:** According to Salvadori (1895) these have a shorter crest and no crescentic markings on the breast; the middle of the lower breast and abdomen are conspicuously white, with very few dusky mottlings.

**YOUNG IN DOWN** (Tring Museum): Compared with the young of the Red-breasted Merganser this species is very much darker, almost coal black above, and there is only the faintest trace of light-colored wing-, scapular- and rump-patches. The chin, throat and upper breast are rusty red, not white as in *Mergus serrator*, while the remainder of the lower side is light gray instead of pure white.



## DISTRIBUTION

THIS Merganser, of which only a few specimens have ever been taken, is found only on the Auckland Islands, where it has been said to be very rare, if not on the verge of extinction (Jacquinot and Pucheran, 1853; Buller, 1888, 1905; Ogilvie-Grant, 1905b; Hutton and Drummond, 1905; Waite, 1909).

## GENERAL HABITS

NOTHING specific recorded. In regard to the status of this little-known Merganser Mr. J. S. Myers tells me that there are considerable rivers in the Auckland Islands and there is some evidence that this is mainly an inland species, rare on the coast. No human beings live on this lonely island and it is visited only at stated intervals in order to look for possible cast-aways. Since there have been no important introductions of exotic creatures (one or two species of small birds including the Red-poll) there is no reason to suppose that original conditions have changed.

The stomach of a specimen contained fresh-water shrimps which seemed to have come from the interior (Waite, 1909).



## BRAZILIAN MERGANSER

*MERGUS OCTOSETACEUS* VIEILLOT

(Plate 100)

### SYNONYMY

*Mergus octosetaceus* Vieillot, Nouv. Dictionnaire des Sci. Nat., vol. 14, p. 222, 1817.

*Mergus octosetaelus* Vieillot, Encyclop. Méthodique, vol. 1, p. 351, pl. 236, fig. 3, 1823.

*Mergus fuscus* Lichtenstein (*nec* Latham), Verzeichniss Doubletten, p. 85, 1823.

*Mergus brasilianus* Vieillot, Galerie des Oiseaux, vol. 2, p. 209, pl. 283, 1825.

*Mergus octosetalus* Boie, Oken's Isis, p. 980, 1826.

*Mergus brasiliensis* G. R. Gray, Genera Birds, vol. 3, p. 624, 1844.

*Mergus lophotes* Pucheran (*ex* Cuvier, MS.), Rev. et Mag. de Zool., ser. 2, vol. 2, p. 551, 1850.

*Mergus octosetosus* Bonaparte (*errore?*), Comptes Rend. Acad. Sci. Paris, vol. 43, p. 652, 1856.

*Prister brasilianus* Heine and Reichenow, Nomen. Mus. Heineanum Ornith., p. 350, 1890.

*Merganser brasilianus* Salvadori, Cat. Birds British Mus., vol. 27, p. 485, 1895.

*Prionochilus brasiliensis* Bertoni, An. Cient. Paraguayos, 1901, p. 8.

*Note:* Although Vieillot renamed this species *Mergus brasilianus*, in 1825, his previous name, *octosetaceus*, dating from 1817, has priority and must stand as valid in spite of its inappropriateness.

### VERNACULAR NAMES

*English:* Brazilian Merganser.

*German:* Brasilianischer Gänsesäger.

*French:* Harle de Brazil.

*Portuguese:* Mergulhador.

*Spanish:* Patao.

*Dutch:* Stekelstaarteend.

### DESCRIPTION

ADULT MALE (specimen in British Museum taken at Utarare River, Brazil, August 15, 1882, and labelled female, but almost certainly a male): Sexes not very different. Head and upper neck black with glossy-green reflections, more brownish on chin and throat and lacking metallic colors. A long pendent occipital crest of ten or fifteen feathers. Mantle, scapulars, back, rump and tail nearly uniform dark brown with greenish reflections. Lower neck, upper breast and extending high up on sides of breast dark gray, minutely vermiculated with whitish. Remainder of lower parts conspicuously barred with irregular brown and white transverse markings. Along lower flanks and under tail-coverts the markings are finer and more or less vermiculated. Wing-coverts brown like the back, except the last row which are broadly tipped with white. Secondaries white, except the basal thirds which are black. Primaries uniform dark brown like the scapulars and back. Under wing-coverts dark brown tipped with white.



Color of soft parts not well recorded.

Wing about 183–188 mm ; bill 50; tarsus 41.

ADULT FEMALE (specimen from Santa Ana, Territory of Misiones, collected by F. M. Rodríguez, No. 6521, Museo Nacional de Historia Natural, Buenos Aires): Head and neck blackish, with dark greenish reflections on side of head and hind neck. Feathers of occiput elongated forming a crest whose two longest feathers are about 85 mm. in length. Entire upper surface, interscapulars, back, rump, tertials, lesser and median wing-coverts, and upper tail-coverts between fuscous and fuscous black, the interscapulars with a faint rusty edging; tail concolor with back. Outer primary drab; inner primaries "chætura black" on the outer web, inner webs hair-brown, shafts somewhat paler. Secondaries, except two inner, hair-brown at base and on the inner web, becoming black on the outer web at about two-thirds their length; remainder of outer web white. Two inner secondaries "chætura black" for about half the width of the outer web, becoming a frosted hair-brown on the inner and remainder of the outer webs. Greater coverts dull blackish, a white tip 10 mm. wide overlapping the dark portion of the secondaries and forming with them a large divided white wing-patch. Alula "chætura black." Below, sides of neck and upper breast whitish closely and finely vermiculated with hair-brown; feathers of breast, sides and belly whitish with hair-brown vermiculations basally and crossed centrally and terminally by bands of hair-brown, about 3 mm. in width. Under tail-coverts fuscous with whitish bases, outer ones more or less sprinkled with white, inner ones crossed by three or more whitish bars a millimeter in width. Flanks fuscous with broken whitish vermiculations.

Wing 187.5 mm.; bill 49.8; tarsus 41 (MS. notes of J. L. Peters).

YOUNG: "Upper surface dull blackish brown, mixed with some scattered pure brown-black feathers; crown, sides of the head, and crest (formed of long, narrow, occipital feathers) blackish, with a slight green gloss; also on the upper part of the neck there are a few black glossy-green feathers; the shorter secondaries and their coverts on the outer web white, except on the base, which is black; therefore on the wing there are a broader and a narrower white speculum, separated from each other by a black line, formed by the black base of the quills; smaller upper wing-coverts (except the smallest) tinged with whitish gray on the outer web; throat and the whole of the fore neck to the breast blackish, the feathers with broadish whitish tips, so that the throat in particular appears very light; remainder of the under surface white, all the feathers crossed with blackish bands, almost evanescent on the middle of the breast and abdomen; under wing-coverts blackish, edged with white; under tail-coverts blackish finely dotted with white-gray; tail feathers partly black-brown; feet and tarsus brown; upper mandible blackish; lower mandible paler" (copied from Salvadori, 1895, where it is quoted from von Berlepsch).

### DISTRIBUTION

THIS rare Merganser is confined to southeastern Brazil and the neighboring regions. Natterer found it as far north as Guardamar in the Province of Goyaz in October, and on the Itararé River (Paraná) in March and August (von Pelzeln, 1868–71). Lichtenstein met with it in São Paulo and Schlüter at Blumenau in Santa Catarina (*fide* von Berlepsch, 1874). H. von Ihering (1904) has recorded it from Salto Grande on the Rio Paranapanéma.

In Argentina the species has been recorded from Santa Ana in the Province of Misiones, where it is said to be uncommon (Dabbene, 1910, and *in litt.*). Mr. J. L. Peters, while collecting in that region, failed to see any of these birds, in spite of a diligent search and Dr. Dabbene, in a recent letter to Mr. Peters, writes that Mr. Conover also failed to find the species in Misiones. Bertoni (1901, 1913) has recorded it from Iguazú in eastern Paraguay.

### GENERAL HABITS

NOTHING specific recorded.





AUCKLAND ISLANDS MERGANSER



BRAZILIAN MERGANSER









MAP 118. Distribution of Brazilian Merganser (*Mergus octosetaceus*)  
Sporadic record indicated by cross (X)







## ADDENDA







## ADDENDA

### MUSCOVY DUCK

*CAIRINA MOSCHATA* (LINNÉ)

Beebe (Beebe, Hartley and Howes, 1917) cites some enemies in British Guiana. Perai and tiger-fish take ducklings and even full-grown birds; alligators and cats are also destructive.

### COMB DUCK

*SARCIDIORNIS MELANOTA* (PENNANT)

Male and female taken at Aderbissinat, south of Asben, Sahara, August, 1920 (Hartert, 1921). Recorded for Lake Naivasha and Nakuru, Kenya Colony, by V. G. L. van Someren (1922). Mr. James P. Chapin tells me that he believes this duck is merely a transient in the Uelle and Ituri districts of the northeastern Belgian Congo.

Additional records for Siam, near Bangkok, are given by Robinson and Kloss (1921).

### WHITE-WINGED WOOD DUCK

*ASARCORNIS SCUTULATA* (S. MÜLLER)

Probably not rare in peninsula of Siam. Various localities are given by Robinson and Kloss (1921).

### HARTLAUB'S TEAL

*PTERONETTA HARTLAUBI* (CASSIN)

What appears to be a southern record for this species are four specimens taken at the Mission of St. Joseph, near Luluabourg in the Kasai district of the south-central Belgian Congo, by Father Callewaert (Chapin, *in litt.*). Another record (see London Field, June 14, 1925) extends the range both north and east of that indicated in my account of this species: Major P. M. Larkin shot one at Bahr-el-Ghazal in the Sudan, and the specimen has since found its way into the British Museum.

Mr. J. P. Chapin has called my attention to another vague reference to *Sarkidiornis ruber* in the notes of Richard Böhm, who died in the Katanga. This bird was seen at Lake Itambi (see Schalow, 1886). The record, if it really refers to Hartlaub's Teal, would extend the range still farther to the southeast.

### PINK-HEADED DUCK

*RHODONESSA CARYOPHYLLACEA* (LATHAM)

A recent expedition to India under the auspices of the American Museum of Natural History in New York, 1922-23, failed to find any trace of this species. Sir



John A. Bucknill (1924) has given a very thorough review of our knowledge of its present status. He cites a few recent occurrences, but it seems that not more than a couple of dozens have turned up in the past twenty years and only three or four since 1920; this in spite of persistent efforts to obtain it in the live state. The vast areas of swamp brought under cultivation in the last fifty years, coupled with the increase of fowling-pieces, have probably contributed to its virtual extinction.

#### AFRICAN PYGMY GOOSE

*NETTAPUS AURITUS* (BODDÆRT)

Weight of a male specimen shot by myself in southwestern Uganda, April, 1924, 10 ounces (0.28 kilograms). Soft parts: iris dark brown, culmen brilliant lemon-orange, legs and feet black.

It seems not to be very common in the lake region of southwestern Uganda, at least at the time of year I was there (spring). I was told that a great many congregate on Lake Edward, near Butiaba, Uganda, at times.

#### GREEN PYGMY GOOSE

*NETTAPUS PULCHELLUS* (GOULD)

Another rendering of the aboriginal name in Australia is *Loonbi* (Lorenson, 1920).

There is reason to fear that this very beautiful species, never very plentiful or widely distributed in Australia, is rapidly declining. A recent letter from Mr. W. B. Alexander to Mr. Outram Bangs, concerning the status of various Australian birds, lists this duck as "becoming scarce." Mr. C. A. Barnard, in his review of the bird-life in the Duaringa district of Queensland during the last fifty years, speaks of it thus: "Formerly a common species, often seen with young in the lagoon, it has now become scarce." It is seldom mentioned in local lists of Australian birds. Mr. Tom Carter (1923), speaking of the Broome Hill district in extreme southwestern West Australia, says that, although he never obtained any himself, he knows of some that were shot at Lake Muir on December 8, 1911, and others that were obtained at Lake Ewlymartiys near Broome Hill (as quoted by Mathews, 1914-15).

#### INDIAN PYGMY GOOSE

*NETTAPUS COROMANDELIANUS* (GMELIN)

I think it is worth while to quote here in full a letter from the late Hubert Astley, concerning the behavior of his birds at Brinsop Court, Herefordshire, England.

"Mr. David Ezra, of Calcutta, took great pains to ship me some Cotton Teal in 1912 and 1914. I believe they had a small tank of water on board ship, in their crate, sufficient for them to bathe in.

"I had eleven, keeping them at first in a wire enclosure at the verge of a pond, in which rushes grew. Unfortunately, a large rat managed to dive underneath the wire which was below the surface of the water to the ground, and eventually killed nine



before I could discover the ingress, until one day I saw the brute inside and witnessed his exit. He dived at one corner and appeared outside at a point where the meshing was slightly bent up, close to the mud bottom. Finally I risked letting out the remaining pair of Cotton Teal, which I pinioned, and they lived for four years on the open water, becoming quite tame. I had them for nine years in all, and I believe they would have lived for a long time.

"They fed on wheat, which they picked up in very shallow water, tipping down quickly for each grain.

"So long as they had a small patch of open water when the rest was frozen in winter, they never seemed to feel the cold at all. It is possible that, had I pinioned only the female, the male might have remained full-winged with her. He assumed breeding plumage in April, losing it again in August. The last spring that I had them, I saw them mating, and the little male constantly called. Had they survived, I feel sure they would have nested. I *never* saw them off the water, nor did I ever see them dive. When first imported they require care, and I kept them in an aviary where there is a shallow cement basin, into which I dropped hemp seed and wheat, decreasing the hemp until they ate wheat entirely.

"There is no doubt that, if a pair could be kept in an absolutely rat-proof enclosure with a small, partly rush-covered pond with shallow edges, in a sheltered position, with water running through to avoid freezing, these fascinating little ducks would live well and perhaps breed. Various water-plants could be introduced, with a supply of water-snails.

"My last pair lived through a very hard winter, when the ice had to be broken for many weeks twice a day to give them swimming space.

"They are difficult to import, but once landed, they quickly recover with care and attention."

### WHITE-FACED TREE DUCK

*DENDROCYGNA VIDUATA* (LINNÉ)

A male and a female are recorded by Hartert (1921) as having been taken in mid-August, 1920, at Aderbissinat, south of Asben, Sahara, a rather far-northern record for that part of Africa. The Tuareg name is *Enna*.

A curious effect of shooting arrows into flocks of these ducks is quoted by Chubb from R. Schomburgk (1848, p. 407), as follows: "The small visissi ducks with their whistling call seemed bound to be close to us; as soon as we were discovered by them one of our native companions at once jumped into the water up to his neck from where he continued to send well-aimed arrows into the dense flocks of these ducks. If they were flying high and could see the arrow coming, they at once opened out in all directions and came into violent contact with each other, breaking their wings and skinning each other." Often five or six of them came down.



## FULVOUS TREE DUCK

*DENDROCYGNA BICOLOR* (VIEILLOT)

A very interesting paper by Dickey and Van Rossem (1923) gives a full account of the nesting habits at Buena Vista Lake, Kern County, California. These writers point out the remarkably irregular or casual habits with regard to nest site (domed or open, floating or dry) and the size of the clutch. They record the sociable nature, even in the breeding season, and the long attendance of the male at the nest. They noticed that the bones of these ducks were extremely brittle and could be fractured at long ranges with small shot.

The food at Buena Vista Lake was principally wild timothy and in the late summer and autumn the seed from several varieties of *Polygonum*. Communistic nests and "storehouse" nests were found, besides some admixture with the eggs of Ruddy Duck and Pintail. One set of seventeen eggs contained at least six parasitic eggs of the same species and many of these eggs seemed to be sterile.

The juvenal plumage is well described. It is everywhere paler, the blacks less pure and strongly tinged with brown, while the white areas on the feathers of the flanks, rump and neck are usually duller or suffused with buffy. The chestnut color on the wing-coverts averages brighter in the adults, but it may be almost lacking irrespective of age or sex. The juvenal bill is nearly straight with none of the concavity so pronounced in mature birds. The first-autumn or immature plumage is attained about the middle of October and is very nearly identical with that of fresh autumn adults.

## WANDERING TREE DUCK

*DENDROCYGNA ARCUATA* (HORSFIELD)

Various recent notes in *The Emu* by Australian ornithologists would lead to the opinion that this species is still fairly numerous in parts of Queensland and New South Wales. The nest in Australia is at least frequently (always?) placed on the ground and usually near water.

## LESSER WHISTLING TEAL

*DENDROCYGNA JAVANICA* (HORSFIELD)

In a paper by H. N. Ridley (1906) on the animals living in the menagerie at Singapore mention is made of these ducks being kept and bred in the gardens. They used to rear young which were often destroyed by eagles and kites. At one time, when there was a crocodile in the lake, they used to roost each night on the leaves of the *Victoria Regia* water-lily and "frequently laid eggs there."

According to what Mr. Blaauw told me in 1921, this species has never been bred in confinement in Europe. Those which he himself kept failed to respond in any way.



## GRAY-BREASTED TREE DUCK

*DENDROCYGNA DISCOLOR* SCLATER AND SALVIN

Recorded by Lönnberg and Rendahl (1922) for Ecuador.

Mr. Blaauw told me in 1921 that he did not believe that this species had ever been bred in confinement.

## SPOTTED TREE DUCK

*DENDROCYGNA GUTTULATA* WALLACE

Mr. Blaauw told me that so far as he knew this species had never been bred in captivity.

## EYTON'S TREE DUCK

*DENDROCYGNA EYTONI* (EYTON)

It is said to be rare now in the Duaringa district of Queensland (C. A. and H. G. Barnard, 1925). It is recorded from northern Queensland recently by Church (1925), and is noted as very common in New South Wales, where, however, some nests are destroyed by foxes (D'Ombraïn, 1921). On the whole, there seems to be no immediate danger surrounding this duck.

## EGYPTIAN GOOSE

*ALOPOCHEN ÆGYPTIACUS* (LINNÉ)

M. Jean Delacour informed me that he had in his collection of live water-fowl at Clères, France, two male hybrids between a female Egyptian Goose and a male Magellanic Goose.

Hartert (1921) has recorded a female taken in mid-August, 1920, at Aderbissinat, south of Asben, Sahara, and says that the native Tuareg name there is *Tchghenem*.

I found these geese plentiful in western Uganda and the eastern Congo in 1924; in many places they were almost the only water-fowl present, and I converted a good number into "soup meat," about the only use to which they can be put.

## COMMON SHELDRAKE

*TADORNA TADORNA* (LINNÉ)

Weight given in Volume I is too low. It should be  $3\frac{1}{2}$  to  $3\frac{3}{4}$  pounds (1.58 to 1.70 kilograms), possibly up to 4 pounds (see Payne-Gallwey, 1896; and others).

## RADJAH SHELDRAKE

*TADORNA RADJAH* (GARNOT)

Another English name for this bird is Mangrove Duck. H. L. White (1917) records specimens shot in Northern Territory, Australia, which had their stomachs full of beetles.



## CRESTED SHELDRAKE

*PSEUDOTADORNA CRISTATA* KURODA

(Plates 101, 102)

This heretofore rather mysterious and almost mythical bird has again had attention directed to it through the taking of a male and a female specimen. The male was presented to Mr. N. Kuroda in 1924 and was taken (with a female which was given to a friend of the collector) at the mouth of the Kun-kiang River near Kunsan, western Korea, in 1913 or 1914, by Mr. S. Nakamura, of Seoul. This river is the boundary between the provinces of West Chhung-chheng and North Chel-la.

In a paper in *Tori* (vol. 4, no. 18, October, 1924), Mr. Kuroda published a plate as well as a full description of his interesting find, besides reproductions of ancient Japanese drawings of the species. The known specimens, three in number, correspond very well with the old pictures, and Mr. Kuroda now feels certain that *Pseudotadorna cristata* is a valid species and not a hybrid. He has most kindly sent me a very beautiful plate made by the artist Kobayashi, which shows both sexes, besides a detailed study of the scutellation of the legs and feet. I have had both these plates reproduced, so that an adequate idea may be obtained of this, the latest and probably the last striking novelty among the Anatine birds of the world.

ADULT MALE (from Kuroda, 1924): There is no white area on the head and neck, as in the female. A black longitudinal band covers the forehead, crown of head and hind neck, and has a dusky dull-green luster in some lights (Ridgway, *Color Standards*, 1912). The long nuchal feathers are more plentiful than in the female (type), forming a more pendent crest or tuft. These nuchal feathers have grayish-white bases tipped with greenish black. The feathers on both sides of the base of the upper mandible, sides of the face, neck and fore neck uniformly "smoke gray" with small and very indistinct bars of dark brown, which are a little more distinct near the hind neck. A small very indistinct whitish area on the under side of the eye, with black and dark-brown blotches; a large and conspicuous blackish-green patch on the chin. From the lower parts of the hind neck to the upper part of the mantle lustrous greenish black, making a band across the sides of the lower neck and uniting with a large pectoral band of greenish velvety black which changes to purplish black in some lights, reaching down to the fore edge of the breast. The bases of the black pectoral feathers have very small white spots which are invariably hidden by the black tips. The border of the chest and breast is irregular in outline; upper and under parts of body somewhat resembling in coloration those of the female but decidedly darker, "slate-gray," with narrow vermiculated whitish lines. The shorter scapulars are like the back in color, washed with a color very near "ochraceous tawny." Outer webs of long scapulars "chestnut" instead of the rusty color of the female; outer webs of tertials distinctly darker than in the female, "claret brown" with broad "light neutral-gray" tips. The lower rump is greenish black like the upper tail-coverts; shorter under tail-coverts much darker than in the female, "orange-rufous" tipped with pale "ochraceous orange." Longer and outer under tail-coverts pure white; a small black patch on the border between the under tail-coverts and the flanks. Flanks like abdomen but somewhat washed with rusty and pale wavy lines. Speculum, upper and under wing-coverts, and axillars like those of the female but with faint grayish tips to the under primary coverts.

A small knob-like appendage at the base of the culmen with a distinctly elevated area close to it on





CRESTED SHELDRAKE

Adult Male  
(Western Korea, 1913-14)

Adult Female (type)







the sides of the mandible, 6.5 by 6 mm. in size. Hind aspect of tarsus reticulated. (These last characters should be added to the original diagnosis of the genus.)

Bill red or pinkish in life, and legs red, according to Mr. N. Kuroda.

Wing 320 mm.; exposed culmen 45; tail 117; tarsus 49.5; middle toe and claw 54. Tail-feathers twelve in number (fourteen in the type).

See also a discussion of this subject by Prince N. Taka-Tsukasa and Dr. Hartert published in the Bulletin of the British Ornithologists' Club, vol. 45, p. 46, December 29, 1924.

Professor P. Sushkin has kindly examined the drawings of the legs and feet and writes me as follows. He confesses to being unable to find any real evidence of hybrid origin. "The tarsus seems to be a trifle longer than the middle toe as in the Shelldrakes, *Casarca* and *Tadorna*, contrasted with the Falcated Teal (*Anas falcata*) where it is shorter. The external toe is decidedly shorter than the middle one, as in *Casarca*; the anterior row of shields goes up as far as it does in the Sheldrake. Peculiar is the fact that the whole upper side of the external toe, up to its very base, is covered by transverse scutellæ. In *Casarca* and *Tadorna* the base of the external toe is decidedly reticulated. This character recalls more *Anas falcata* but in *falcata*, too, the basal scutellæ do not run right across, being shorter than the rest of them."

There seems to me very little doubt now that this highly peculiar duck is a valid species and perhaps a genus. It has probably been a vanishing bird for a long time and it seems very doubtful whether many specimens will come to light in the future. I wish again to express my thanks to Mr. Kuroda for the preparation of the plate here reproduced.

### RUDDY SHELDRAKE

#### *CASARCA FERRUGINEA* (PALLAS)

Mr. James Neely tells me of a specimen shot two or three years ago at the Wapanola Club in Terrell, Arkansas, and now mounted at the Club. This may, of course, have been an escape.

A recent observation on the incubation period by Hugh Wormald bears out an older estimate of twenty-nine days. Under a hen Mr. Wormald's Ruddy Sheldrake eggs hatched in twenty-eight days.

### SOUTH AFRICAN SHELDRAKE

#### *CASARCA CANA* (GMELIN)

Mr. W. S. Brooks was in South Africa the past winter of 1924-25 and during his visit made special efforts to get news of this rare duck and to locate specimens for this Museum. He tells me that nobody appeared to know anything about it. There are a few skins (seven or nine) at the Transvaal Museum in Pretoria; and in the South African Museum at Cape Town there are two skins and two poorly mounted specimens. Other museums of the country have only very few mounted specimens,



in bad condition. Mr. Brooks did not have the opportunity to talk with many sportsmen.

### AUSTRALIAN SHELDRAKE

*CASARCA TADORNOIDES* (JARDINE AND SELBY)

This handsome species is said to be getting scarce in the Monaro district of New South Wales, owing to the depredations of the introduced fox (H. V. Edwards, 1924).

### MALLARD

*ANAS BOSCHAS* LINNÉ

A paper entitled "Sex Ethology of the Mallard," by Geyr von Schweppenburg (1924), attempts to show that some of the mating antics, such as nuptial flights, are an expression of the male's instinct for controlling territory rather than merely to satisfy the polygamous urge. We need further careful observations on absolutely wild birds under uncrowded field conditions to clear up this interesting point.

A summary of our knowledge of migration, as added to by the return of banded ducks, was published by Lincoln (1924) in a Bulletin of the United States Biological Survey.

### OUSTALET'S GRAY DUCK

*ANAS OUSTALETI* SALVADORI

I have made considerable effort to find out something more concerning the status of this duck. Finally Mr. C. W. Edwards, in charge of animal husbandry at the Guam Agricultural Experiment Station, wrote me a letter dated October 12, 1923. "The natural local enemies of *A. oustaleti* are the large lizard (*Varanus*, sp.), rats, and wild cats. The Americans who go hunting might be classed as introduced enemies.

"Judging from local indications this species of duck is not nearly so commonly seen here now as it was some years ago. I judge this from my own observations and from the statements of others who have lived here for some time. This is also the opinion of a number of reliable natives with whom I have conferred on the subject."

I do not know what its status in Saipan may be.

### PHILIPPINE MALLARD

*ANAS LUZONICA* FRASER

Mr. J. V. De Laveaga, of San Francisco, who has a large collection of live waterfowl, writes me that a short time ago he obtained three live specimens of this duck, all that was left of a shipment of five pairs sent from Manila. So far as I know these are the first ever sent alive to America or Europe.



## AUSTRALIAN DUCK

*ANAS SUPERCILIOSA* GMELIN

Further information on the great irregularity of the nesting season in extreme southwestern Australia (Broome Hill district) comes from Tom Carter (1923), who shows that eggs and young may be found from August to January. He found some nests a mile from nearest water. Mr. Charles Barrett has sent me photographs of a nesting hollow high up in a dead stub near water.

A nest in a white pine (*Podocarpus*) at least forty-five feet above ground is reported by R. H. D. Stidolph (1922). Early in the morning Mr. Stidolph noticed a duck fly out of the nest-tree and soon afterward saw seven ducklings fall out, all arriving safely on the ground.

## AFRICAN YELLOW-BILLED DUCK

*ANAS UNDULATA* DUBOIS

Mr. J. P. Chapin tells me of getting three specimens from Lake Munhamba, near Luluabourg, in the Kasai district of the southern Congo, in a region where the bird has probably not been recorded before.

I found many of these ducks in southwestern Uganda in the spring of 1924. Males weighed 2 pounds each (0.90 kilograms) and females 1 pound, 12 ounces to 1 pound, 15 ounces (0.79 to 0.87 kilograms). The males look a good deal larger than the females in flight. The bill-color is the same in both sexes: a brilliant lemon-orange which shows up as a conspicuous field-mark as far away as half a mile. The legs are dirty dark brown to lead color or even blackish. I found these ducks extremely tame in some lakes where they were almost never disturbed, swimming ahead of a native dugout canoe almost like barnyard ducks. They are far tamer than Southern Pochard or White-backed Ducks on the same waters.

The voice was, I thought, just a little weaker than the Mallard's, but the difference is certainly very slight. The tracheal box is small, left-sided and very Mallard-like in appearance.

## AFRICAN BLACK DUCK

*ANAS SPARSA* EYTON

I saw almost nothing of this duck during recent journeys through Kenya, Uganda, and the eastern Congo. I dare say that by searching the rapid upper waters of forested streams one would find them in many places. I actually saw it but once, on a stream near Nanuki, west slope of Mt. Kenya, while fishing for rainbow trout, a species recently introduced there.



## BRONZE-WINGED DUCK

*ANAS SPECULARIS* KING

Lord William Percy, who was in Chile in 1924, found a place where these ducks were plentiful and tame, and he has very kindly sent me some notes on their behavior. "This is an open marsh country at sea level intersected by a river half a mile broad with forests outside the marsh. *Anas specularis* is in some ways a very striking bird in the field and its voice is so remarkable that I wonder it has not always been mentioned in connection with them. The females make a noise exactly like the barking of a small dog (hence their name, *Pato perro*), and many a time at night I have listened to a party of these ducks thirty yards from the tent and wondered whether the sound was produced by *patos* or *perros* (ducks or dogs). I could never make out for certain whether the males bark too, but whenever I could observe males alone they only made a whistle such as can be reproduced by drawing a cutting whip through the air. They fed principally on vegetable matter but nightly repaired to the shingle twenty-five yards from my tent door to eat the small snails that abounded among the stones."

Percy saw the courtship only once and says that it was almost exactly like that of the Common Pintail. They nest, he says, in September, but the season is a long one as with other water-fowl in that part of the world. He seldom saw more than a few together (once eighteen), but noted family parties consisting of both parents and from five to nine young about five months old at the end of February. Judging from the young he got, he rather thought that there might not be any white on the head in the juvenal dress. His immature specimens, a plumage I have never seen, were heavily streaked on the breast. By nature these Bronze-winged Ducks were very tame indeed, almost indifferent to an observer. Percy adds, "You will be horrified to learn that I ate many more than I skinned — but I had no one to help me."

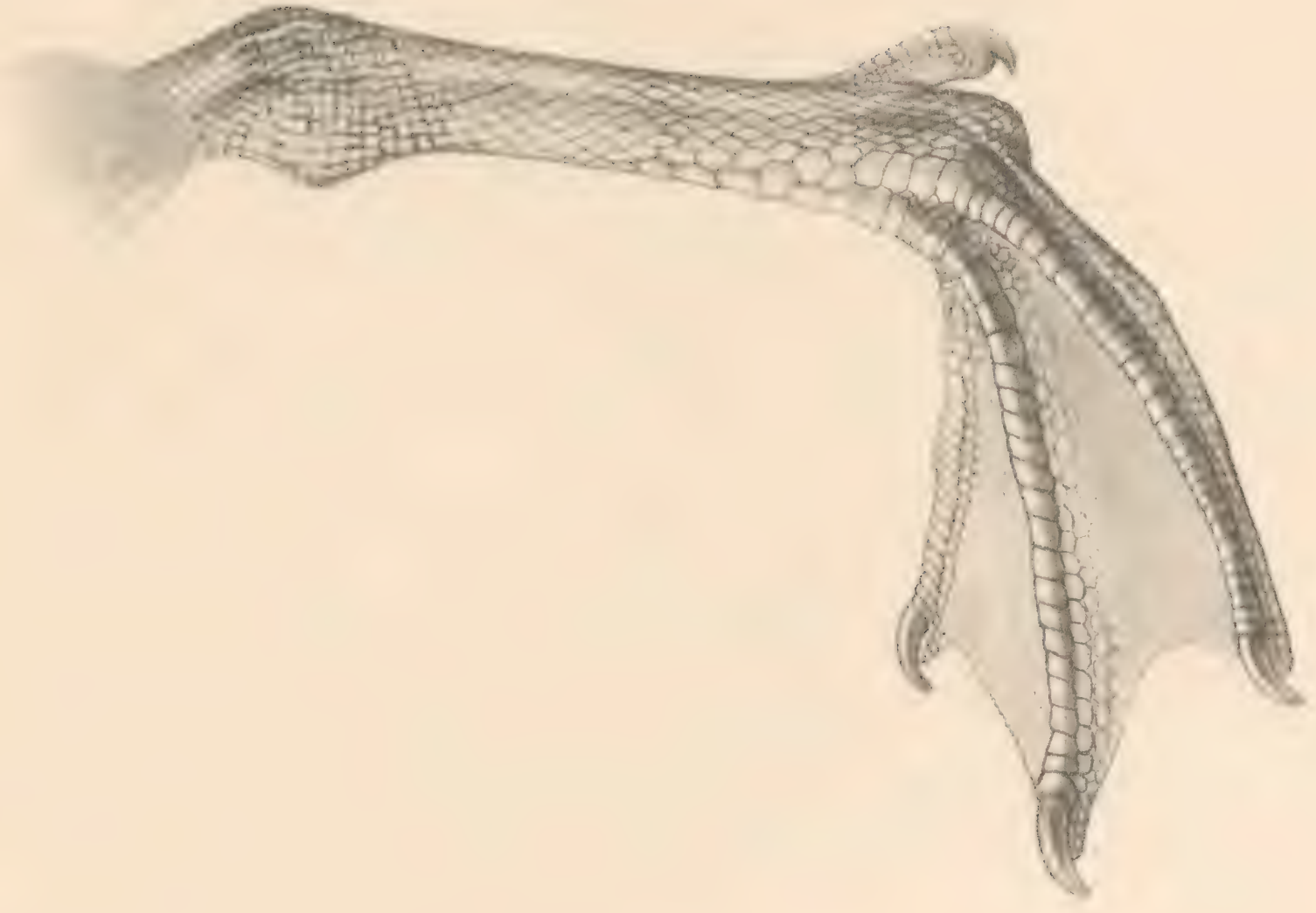
## COUES'S GADWALL

*ANAS COUESI* (STREETS)

This bird must now be placed on the list of those species certainly extinct. When Dr. Alexander Wetmore was on his recent (1923) expedition to the islands west of the Hawaiian group, he had with him Mr. W. G. Anderson of Honolulu, who was born some thirty years before on Fanning Island. The latter was perfectly familiar with Washington Island, only eighty miles distant. Migrating ducks visit these islands and their pursuit is a regular sport and he felt sure that such a curiosity as a native species could not have escaped his attention. It was probably extirpated by settlers who did not recognize it as peculiar a good many years ago (Wetmore, 1925).

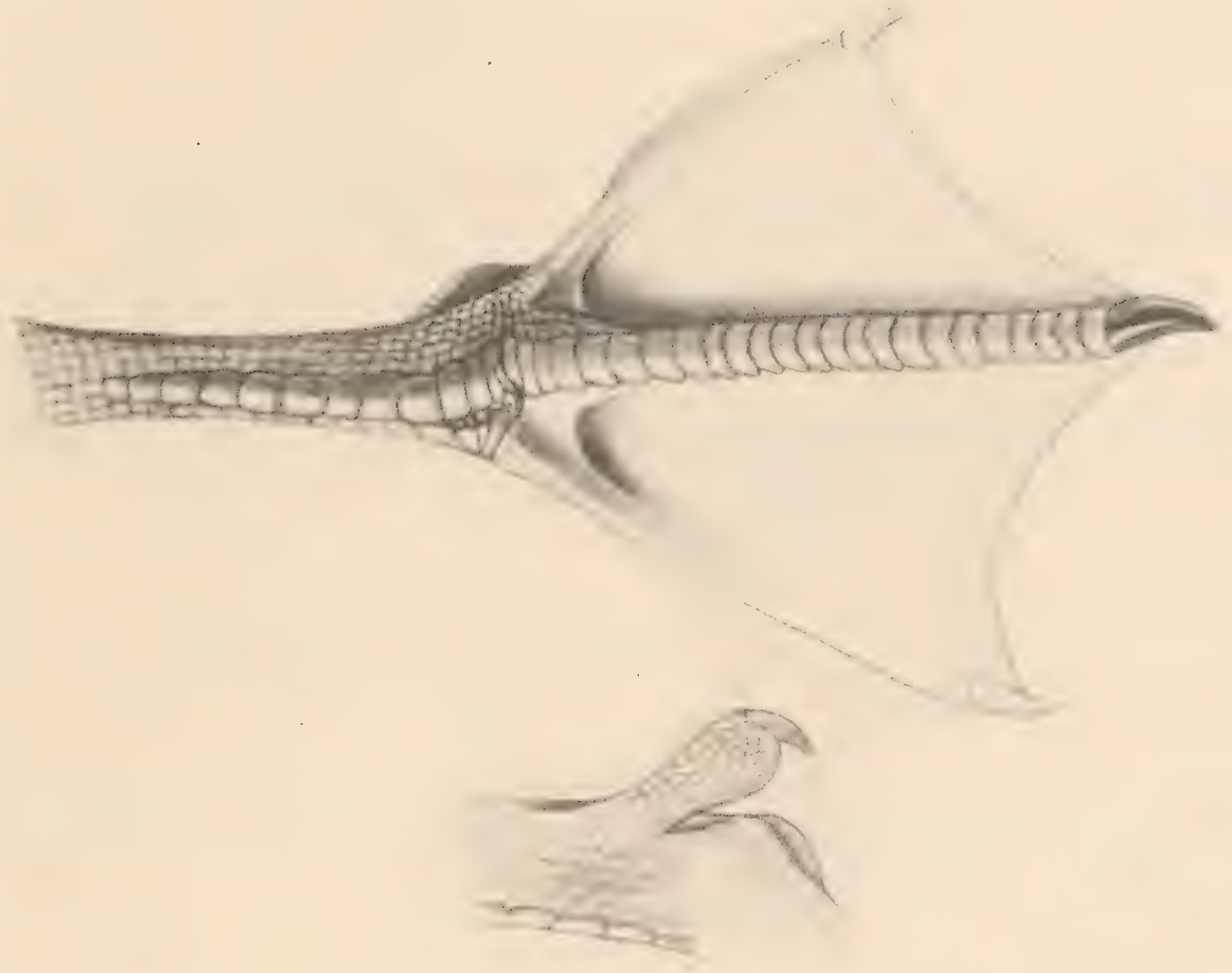
There are no existing specimens besides the two mentioned in my account of the species. One more reference to the bird by Dr. T. H. Streets, its discoverer, should be mentioned, and this is his account of the natural history of the Fanning group of islands, published in the *American Naturalist* for 1877.





FOOT OF CRESTED SHELDRAKE

Female (type), three views



Male, front view







## EUROPEAN WIDGEON

*ANAS PENELOPE* LINNÉ

There is an additional record for southern Labrador: Bonne Esperance, November, 1919, and possibly sight records of four more at the Mingan Islands, June 13, 1923 (H. F. Lewis, 1925).

## CHILIAN WIDGEON

*ANAS SIBILATRIX* POEPPIG

Two years ago M. Jean Delacour of Clères, France, had in his ponds a hybrid between a male Chilian Widgeon and a female Carolina Duck. This cross was produced on his estate and he told me that it was "among the most peculiar hybrids that he had ever seen."

## EUROPEAN TEAL

*ANAS CRECCA* LINNÉ

A good review of the results of banding Teal in Europe was published by Mr. F. C. Lincoln (1925), in charge of the bird-banding work of the United States Biological Survey at Washington.

## FORMOSAN TEAL

*ANAS FORMOSA* GEORGI

This Teal will now have to be added to the North American faunal lists since its capture at Wainwright, Alaska (A. M. Bailey, 1925) and at Dungeness, Clallam County, Washington (D. E. Brown, *The Murrelet*, vol. 5, no. 3, p. 11, 1924).

The species has recently been taken in Holland (Snouckaert, *Jaarb. Club Ned. Vogelk.*, 1923, p. 103).

## CHESTNUT-BREASTED TEAL

*ANAS CASTANEA* (EYTON)

A female of this Teal crossed with a male Yellow-billed Teal (*Anas flavirostris*) in the collection of water-fowl at Clères, France (letter from M. Jean Delacour). I reported this same hybrid under the account of *Anas castanea*, in Volume II.

## CAPE TEAL

*ANAS CAPENSIS* GMELIN

A northern extension of the range of this duck has just been made known by Admiral Hubert Lynes (1925), who found several at the crater of Jebel Marra in Darfur, Sudan, at the end of April, 1921. He thinks this may be a scarce summer breeding visitor, and not a resident.



## HOTTENTOT TEAL

*ANAS PUNCTATA* BURCHELL

The weight of these little ducks, as I found them in southwestern Uganda in 1924, was from 8 to 9 ounces (0.22 to 0.25 kilograms). They and the Yellow-billed Ducks were extraordinarily tame in some of the lakes. Their flesh made a very welcome change in our diet of sheep and goat meat.

## PINTAIL

*ANAS ACUTA* LINNÉ

My map of the distribution of the Pintail in Africa is somewhat too conservative. There is no doubt from what I have been told that it comes to Lake Chad with other migrant ducks in great numbers at times, and it has been recently reported from Bornu, Nigeria (Bannerman and Bates, 1924). It is also common in Kenya at times.

Mr. F. C. Lincoln (1925) has collected all the available migration records obtained by banding Pintails in Europe and has published them in the Auk.

It appears that the American and European races of this duck (races which are really well marked, at least in the male sex) are inclined to stray from their allotted territories. Thus, the only Chinese specimen which we happen to have in the collection of the Museum of Comparative Zoölogy is a typical example of *Anas acuta tzitzihoa*. Examples recently taken on the Seward peninsula and at Wainwright, Alaska, are said to be typical Old-World birds (*Anas acuta acuta*), while one from Point Barrow belongs to the American race (A. M. Bailey, 1925).

## AFRICAN RED-BILLED DUCK

*ANAS ERYTHORHYNCHA* GMELIN

These ducks were scarce in the spring of 1924 in southwestern Uganda. No doubt they were scattered about as this is the rainy season. A male which I shot at Lake Muanga, April 8, weighed 1 pound, 7 ounces (0.65 kilograms). The culmen was bright blood-red on the sides, shading to a delicate purple at the tip and having the nail almost white. The top of the culmen down to within two-thirds of an inch of its tip was dusky brown. The lower mandible was pinkish.

Aside from its remarkable-looking bill the most interesting thing about this duck is its huge left-sided triangular-shaped tracheal box, proportionally very much larger than the same structure in the typical Mallard-like ducks. It measured  $1\frac{1}{8}$  inches in its longer axis by about  $\frac{3}{4}$  inch across its large end, and was exceedingly thin-walled.

## GARGANEY TEAL

*ANAS QUERQUEDULA* LINNÉ

The occurrence of two specimens of this duck in Victoria, Australia, has already been mentioned. There is a third, a mounted one, in the National Museum at Mel-



bourne, obtained by Mr. Charles Hooper at Lake Colac in 1881 (A. J. Campbell, 1924).

### BLUE-WINGED TEAL

*ANAS DISCORS* LINNÉ

William MacDonald thought he saw these Teal as far north as Fort Providence, MacKenzie River, in 1924, which is much farther north than he ever noted them before (W. Rowan, *in litt.*).

Mr. Hugh S. Gladstone writes me that the specimen taken in Dumfriesshire was shot in 1858 and that none was taken in 1863. This 1858 specimen is a female, not a male as usually recorded, and it is now in the Royal Scottish Museum (see his Birds of Dumfriesshire, 1910).

### RED-CRESTED POCHARD

*NETTA RUFINA* (PALLAS)

I have to record an interesting brood of hybrids between a male of this duck and a female Australian Black Duck reared on Mr. J. V. De Laveaga's ponds at San Mateo, California.

### CANVAS-BACK

*NYROCA VALISINERIA* (WILSON)

The first instance of the nesting of these ducks in confinement in Europe has just been reported by Messrs. McLean and Wormald of East Dereham, Norfolk (London Field, June 11, 1925). A pair, apparently from the lot which I shipped to them in December, 1922, nested last spring and the female laid her first egg on May 20, 1925, and up to May 30 she had deposited eight more. I do not anticipate that these skilful wild-fowl breeders will have any special difficulty in rearing the young provided the eggs prove fertile.

### SCAUP DUCK

*NYROCA MARILA* (LINNÉ)

Does considerable damage at times on the oyster beds in the vicinity of Olympia, Washington (R. C. Steele, The Murrelet, vol. 3, no. 2, p. 6, 1922).

### BUFFLE-HEAD

*BUCEPHALA ALBEOLA* (LINNÉ)

Mr. Joseph Dixon writes me that he has at last obtained satisfactory evidence that this bird does breed as far south as California. On June 30, 1925, he collected a family of four downy young and their mother at Eagle Lake, Lassen County. The specimens are now in the Museum of Vertebrate Zoölogy of the University of California.



## LONG-TAILED DUCK

*CLANGULA HYEMALIS* (LINNÉ)

Again found breeding commonly far in the interior of the Canadian barren lands just northeast of Great Slave Lake (Blanchet, 1925).

## AMERICAN WHITE-WINGED SCOTER

*OIDEMIA FUSCA DEGLANDI* BONAPARTE

A young male taken in Cameron Parish, Louisiana, December, 1924 (A. M. Bailey, 1925a).

On July 25, 1925, Dr. A. Wetmore saw an adult bird at Nomini Cliffs, Westmoreland County, Virginia.

## DRESSER'S EIDER

*SOMATERIA MOLLISSIMA DRESSERI* RIDGWAY

The damage done to these Eiders by the bad weather and the plague of Arctic foxes in 1922 seems to have been repaired during a good breeding season in 1923 (H. F. Lewis, 1925).

Payne-Gallwey mentions 5 pounds, 12 ounces to 6 pounds (2.60 to 2.72 kilograms) as top weight for a very large male of the Common Northern Eider.

## SMEW

*MERGELLUS ALBELLUS* (LINNÉ)

Payne-Gallwey (1896) gives the weight as from 1 pound, 8 ounces to 1 pound, 10 ounces (0.68 to 0.73 kilograms).



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# ERRATA

## VOLUME I

Page 49, line 2, for Brisson read Linné.

Page 59, line 33, for Rocca read Roca; and for north read south.

Page 90, line 5, for Indian read Index.

References to names of *Anatidæ* in Gmelin's 13th edition of Linné's Systema Naturæ have been shown to date from 1789, not 1788 (Hopkinson, Proc. Zool. Soc. London for 1907, p. 1035, 1908).

This change should be made as follows:

Page 94, line 7.

Page 204, line 7.

Page 102, line 6.

Page 247, line 5.

Page 128, line 5.

Page 250, line 5.

Page 121, line 29, for *brunea* read *brunnea*.

Page 128, line 15, for *Pat silvon* read *Pato silvon*.

Page 129, line 37, for Alborni read Alberni.

Page 163, line 5, for Beytrage read Beyträge.

Page 185, line 23, after trachea add "except in *Heteronetta*."

Page 187, line 2, for Brisson read Linné.

Page 200, line 9, for 1888 read 1885.

Page 239, line 31, for Demidorff read Demidoff.

## VOLUME II

The date of that part of Gmelin's edition of Linné's Systema Naturæ dealing with *Anatidæ* should be changed from 1788 to 1789 in the following:

Page 3, lines 7 and 21.

Page 188, line 5.

Page 68, line 6.

Page 231, line 5.

Page 90, line 7.

Page 267, line 5.

Page 103, line 5.

Page 281, line 5.

Page 112, line 34.

Page 295, line 5.

Page 167, line 8.

Page 353, line 6.

Page 358, line 7.

Page 93, line 16, for "think she" read "thinks he"

On the following pages, for Rollo M. Beck read Rollo H. Beck:

Page 132, line 30.

Page 338, line 25.

Page 134, line 6.

Page 350, line 10.

Page 135, lines 1 and 31.

Page 394, line 34.

Page 136, line 17.

Page 403, line 40.

Page 276, line 22.

Page 408, line 20.

Page 280, line 24.

Page 409, line 14.

Page 268, line 27, for north read south.

Page 291, line 8, for *gibbertfrons* read *gibberifrons*.

Page 358, line 5, for p. 203 read p. 126.

Page 358, line 6, for p. 204 read p. 127.

## VOLUME III

Page 165, line 25, for Kushkonong read Koshkonong.

Page 270, line 30, for *Aythia* read *Aythya*.

Page 329, line 26, for 1923 read 1923a.



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